

KANSAS STATE AGRICULTURAL COLLEGE BULLETIN

VOLUME III

MARCH 1, 1919

NUMBER 3



CATALOGUE

FIFTY-SIXTH SESSION, 1918-19

WITH ANNOUNCEMENTS FOR 1919-20

MANHATTAN, KANSAS
PUBLISHED BY THE COLLEGE

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The State Board of Administration

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GOVERNOR ARTHUR CAPPER, *ex-officio Chairman*²
E. W. HOCH, *Vice Chairman*
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C. W. GREEN⁴

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JAS. T. LARDNER, *Assistant Business Manager*

Administrative Officers

President of the College.....	WILLIAM M. JARDINE
Vice President, and Dean of the Division of General Science	J. T. WILLARD
Dean of the Division of Agriculture and Di- rector of the Agricultural Experiment Station	F. D. FARRELL
Dean of the Division of Engineering and Di- rector of the Engineering Experiment Station	A. A. POTTER
Dean of the Division of Home Economics.....	HELEN B. THOMPSON
Acting Dean of the Division of College Ex- tension	H. J. UMBERGER
Acting Dean of the Summer School.....	H. L. KENT
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Principal of the School of Agriculture.....	H. L. KENT
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Engineer of Power Plant, Superintendent of Building and Repair.....	G. R. PAULING

1. Since January 13, 1919.
2. Previous to January 13, 1919.
3. Since March 3, 1919.
4. Previous to March 3, 1919.

CALENDAR

1919														1920													
JANUARY							JULY							JANUARY							JULY						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	..	1	2	3	4	..	..	1	2	3	4	5	..	..	..	1	2	3	..	..	..	..	1	2	3	
5	6	7	8	9	10	11	6	7	8	9	10	11	12	4	5	6	7	8	9	10	4	5	6	7	8	9	10
12	13	14	15	16	17	18	13	14	15	16	17	18	19	11	12	13	14	15	16	17	11	12	13	14	15	16	17
19	20	21	22	23	24	25	20	21	22	23	24	25	26	18	19	20	21	22	23	24	18	19	20	21	22	23	24
26	27	28	29	30	31	..	27	28	29	30	31	..	..	25	26	27	28	29	30	31	25	26	27	28	29	30	31
..
FEBRUARY							AUGUST							FEBRUARY							AUGUST						
..	..	..	..	..	..	1	..	..	..	..	..	1	2	1	2	3	4	5	6	7	1	2	3	4	5	6	7
2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14	8	9	10	11	12	13	14
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21	15	16	17	18	19	20	21
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28	22	23	24	25	26	27	28
23	24	25	26	27	28	..	24	25	26	27	28	29	30	29	..	..	..	..	..	..	29	30	31	..	..	..	..
..	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MARCH							SEPTEMBER							MARCH							SEPTEMBER						
..	..	..	..	..	..	1	..	1	2	3	4	5	6	..	1	2	3	4	5	6	..	..	1	2	3	4	
2	3	4	5	6	7	8	7	8	9	10	11	12	13	7	8	9	10	11	12	13	5	6	7	8	9	10	11
9	10	11	12	13	14	15	14	15	16	17	18	19	20	14	15	16	17	18	19	20	12	13	14	15	16	17	18
16	17	18	19	20	21	22	21	22	23	24	25	26	27	21	22	23	24	25	26	27	19	20	21	22	23	24	25
23	24	25	26	27	28	29	28	29	30	..	..	..	..	28	29	30	31	..	..	..	26	27	28	29	30	..	..
30	31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
APRIL							OCTOBER							APRIL							OCTOBER						
..	..	1	2	3	4	5	..	..	1	2	3	4	..	..	..	1	2	3	..	..	..	..	1	2	3	4	
6	7	8	9	10	11	12	5	6	7	8	9	10	11	4	5	6	7	8	9	10	3	4	5	6	7	8	9
13	14	15	16	17	18	19	12	13	14	15	16	17	18	11	12	13	14	15	16	17	10	11	12	13	14	15	16
20	21	22	23	24	25	26	19	20	21	22	23	24	25	18	19	20	21	22	23	24	17	18	19	20	21	22	23
27	28	29	30	..	..	..	26	27	28	29	30	31	..	25	26	27	28	29	30	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..
MAY							NOVEMBER							MAY							NOVEMBER						
..	..	..	1	2	3	..	..	..	..	..	..	1	..	..	..	1	2	3	4	5	6	..	..	1	2	3	4
4	5	6	7	8	9	10	2	3	4	5	6	7	8	2	3	4	5	6	7	8	7	8	9	10	11	12	13
11	12	13	14	15	16	17	9	10	11	12	13	14	15	9	10	11	12	13	14	15	14	15	16	17	18	19	20
18	19	20	21	22	23	24	16	17	18	19	20	21	22	16	17	18	19	20	21	22	21	22	23	24	25	26	27
25	26	27	28	29	30	31	23	24	25	26	27	28	29	23	24	25	26	27	28	29	28	29	30	..	..	..	..
..	..	..	..	..	..	..	30	..	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
JUNE							DECEMBER							JUNE							DECEMBER						
1	2	3	4	5	6	7	1	2	3	4	5	6	..	..	1	2	3	4	5	..	..	1	2	3	4	..	..
8	9	10	11	12	13	14	7	8	9	10	11	12	13	6	7	8	9	10	11	12	5	6	7	8	9	10	11
15	16	17	18	19	20	21	14	15	16	17	18	19	20	13	14	15	16	17	18	19	12	13	14	15	16	17	18
22	23	24	25	26	27	28	21	22	23	24	25	26	27	20	21	22	23	24	25	26	19	20	21	22	23	24	25
29	30	..	..	..	..	..	28	29	30	31	..	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..

The College Calendar

1919	
June 6,	Friday.—Registration of students for Summer School begins at 8 a. m.
June 7,	Saturday.—*All classes meet according to schedule
June 7 to August 8,	Saturday to Friday.—Summer School in session, nine weeks
Sept. 5,	Friday.—All members of the instructional force on duty, at 9 a. m.
Sept. 6,	Saturday.—Meeting of assigners with Committee on Schedule at 2 p. m.
Sept. 6,	Saturday.—Meeting of assigners with deans at 3 p. m.
Sept. 8,	Monday.—Admission and registration of students begin at 8 a. m.
Sept. 8,	Monday.—†Special courses for auto-mechanics, tractor operators, machinists, blacksmiths, and carpenters begin
Sept. 9,	Tuesday.—Housekeepers' Course begins; registration at 8 a. m.
Sept. 10,	Wednesday.—Registration of students closes at 11 a. m.
Sept. 10,	Wednesday.—Opening convocation, 11 a. m. to 12 m.
Sept. 10,	Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Oct. 4,	Saturday.—Examinations to remove conditions
Oct. 11,	Saturday.—Scholarship deficiency reports due
Nov. 8,	Saturday.—Midsemester scholarship deficiency reports due
Nov. 10,	Monday.—‡Special semester begins; registration at 8 a. m.
Nov. 26,	Wednesday.—Thanksgiving vacation begins at 12 m.
Nov. 29,	Saturday.—Thanksgiving vacation closes at 6 p. m.
Dec. 20,	Saturday.—Housekeepers' Course closes at 12 m.
Dec. 20,	Saturday.—Winter vacation begins at 6 p. m.
1920	
Jan. 3,	Saturday.—Winter vacation closes at 6 p. m.
Jan. 5,	Monday.—Short Course in Agriculture and Creamery Short Course begin.
Jan. 5,	Monday.—Special courses for auto mechanics, electricians, tractor operators, machinists, blacksmiths, carpenters, and radio-operators begin
Jan. 17 to 24,	Saturday to Saturday.—Examinations at close of semester
Jan. 24,	Saturday.—First semester closes at 11 a. m.
Jan. 27,	Tuesday.—Admission and registration of students begin at 8 a. m.
Jan. 27,	Tuesday.—Housekeepers' Course begins; registration at 8 a. m.
Jan. 28,	Wednesday.—Registration of students closes at 11 a. m.
Jan. 28,	Wednesday.—*All classes meet according to schedule, beginning at 1 p. m.
Feb. 2 to 7,	Monday to Saturday.—Farm and Home Week
Feb. 21,	Saturday.—Examinations to remove conditions
Feb. 28,	Saturday.—Scholarship deficiency reports due
Feb. 28,	Saturday.—Short Course in Agriculture and Creamery Short Course close at 12 m.
Mar. 27,	Saturday.—Special semester closes at 11 a. m.
April 3,	Saturday.—Midsemester scholarship deficiency reports due
April 15,	Thursday.—Announcement of elections of seniors to Phi Kappa Phi
May 8,	Saturday.—Housekeepers' Course closes at 12 m.
May 14 to 20,	Friday to Thursday.—Examinations for seniors
May 20 to 26,	Thursday to Wednesday.—Examinations at close of semester
May 27,	Thursday.—Commencement day
May 28,	Friday.—Registration of students for Summer School begins at 8 a. m.
May 29 to July 30,	Saturday to Friday.—Summer School in session, nine weeks
Sept. 13,	Monday.—Admission and registration of students begins at 8 a. m.
Sept. 15,	Wednesday.—Registration of students closes at 11 a. m.

* Students must be present at the first meeting of each class or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes. A fee of one dollar is charged those who enroll after the time set for close of registration unless a reasonable excuse is offered.

† These special courses begin the first Monday of every month from September to May, also, at the beginning of the Summer School.

‡ For the special semester, which is planned for the benefit of young men who must remain on the farm for the greater part of the year, such classes will be organized as the demand seems to justify. Prospective students should write early, stating what studies they desire to pursue. The College authorities will then know what classes to schedule. Announcement of classes scheduled will be made late in October.

Standing Committees of the Faculty

ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Ina Holroyd, Bessie W. Birdsall, J. O. Hamilton, W. H. Andrews, G. A. Dean, M. C. Tanquary, J. P. Calderwood.

ADVANCED CREDIT: *College*.—R. R. Price, L. E. Call, H. H. King, J. R. Macarthur, Elizabeth Rothermel, J. T. Willard.

School of Agriculture.—J. W. Zahnley, E. V. James, W. T. Stratton, Wilma Orem.

ASSIGNMENT: Jessie McD. Machir, L. A. Fitz, W. H. Andrews, A. E. White, Araminta Holman.

ATHLETICS: President Jardine, M. F. Ahearn, Z. G. Clevenger, G. A. Dean, H. H. King, E. L. Holton, R. A. Seaton.

CATALOGUE: J. V. Cortelyou, J. T. Willard, H. W. Davis.

COLLEGE RULES: R. R. Price, J. T. Willard, J. E. Kammeyer.

DEBATE: J. R. Macarthur, O. H. Burns, J. E. Kammeyer.

DISCIPLINE: Albert Dickens, L. A. Fitz, L. E. Conrad, J. W. Searson, Mary P. Van Zile.

GRADUATE STUDY: L. E. Conrad, L. E. Call, Helen B. Thompson, H. H. King.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, A. E. Westbrook, J. W. Searson, E. L. Holton, W. H. Andrews, W. A. Lippincott.

SCHEDULE OF CLASSES: A. E. White, J. T. Willard, W. T. Stratton, R. I. Throckmorton, L. E. Conrad, Alice Skinner.

STUDENT AFFAIRS: J. R. Macarthur, Mary P. Van Zile, H. H. King, W. A. Lippincott, A. E. Westbrook, C. F. Baker, H. L. Kent, Elizabeth Rothermel.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, Z. G. Clevenger.

Officers of Instruction and Administration

PRESIDENT

WILLIAM MARION JARDINE, B. S. A., LL. D.,
President of the College (1910; March 1, 1918).*
B. S. A., Utah Agricultural College, 1904; LL. D., Campbell College, 1916.
†A 30; 1020 Houston.

PROFESSORS

JOHN DANIEL WALTERS, M. S., A. D.,
Professor of Architecture, Emeritus (1876, 1917).
‡ M. S., 1883; A. D., 1908. E 56; 809 N. Eleventh.

JULIUS TERRASS WILLARD, M. S., Sc. D.,
Vice President of the College (March 1, 1918); Dean of the Division
of General Science (1909); Professor of Chemistry (1883, 1901);
Consulting Chemist, Agricultural Experiment Station (1888, 1918).
B. S., 1883; M. S., 1886; Sc. D., 1907. A 47; 1725 Poyntz.

BENJAMIN LUCE REMICK, Ph. M.,
Professor of Mathematics (1900).
Ph. B., Cornell College, 1889; Ph. M., *ibid.*, 1892. A 71; 613 Houston.

HERBERT FULLER ROBERTS, LL. B., M. S.,
Professor of Botany (1901); Botanist, Agricultural Experiment Sta-
tion (1901).
A. B., University of Kansas, 1891; LL. B., Northwestern University, 1893; M. S.,
1898. H 58; 1920 Poyntz.

ALBERT DICKENS, M. S.,
Professor of Horticulture (1899, 1902); Horticulturist, Agricultural
Experiment Station (1899, 1902).
B. S., 1893; M. S., 1901. H 30; 509 N. Manhattan.

RALPH RAY PRICE, A. M.,
Professor of History and Civics (1903).
A. B., Baker University, 1896; A. M., University of Kansas, 1898.
F 57; 826 Houston.

* One date standing immediately after the title shows when the office was assumed.
In the case of two dates separated by a comma or a semicolon, the first date indicates
when services with the College began, the second when present office was assumed. Dates
separated by a dash indicate times of assumption and termination, respectively, of the
duties indicated in the title.

† The College buildings are designated by letters, as follows:

A—Anderson Hall (Main).	I—Domestic Science and Art Hall.
Ag—Agricultural Hall.	M—Auditorium.
C—Denison Hall.	N—Nichols Gymnasium.
D—Dairy Hall.	R—Farm Machinery Hall.
E—Mechanical Engineering Hall.	S—Engineering Shops.
F—Fairchild Hall (Library).	V—Veterinary Hall.
G—School of Agriculture Hall.	W—Chemistry Annex.
H—Horticultural Hall.	X—Dairy Commission Hall.
K—Kedzie Hall (Printing).	

‡ In a statement of degrees without mention of the institution conferring them the
Kansas State Agricultural College is to be understood.

JULIUS ERNEST KAMMEYER, A. M., LL. D.,

Professor of Economics (1903, 1904).

A. B., Central Wesleyan College, 1886; A. M., *ibid.*, 1889; LL. D., Kansas City University, 1912. A 52; 1005 Laramie.

JOHN VANZANDT CORTELYOU, Ph. D.,

Professor of Modern Languages (1904, 1916).

A. B., University of Nebraska, 1897; A. M., *ibid.*, 1901; Ph. D., University of Heidelberg, 1904. N 59; 325 N. Fourteenth.

JOHN ORR HAMILTON, B. S.,

Professor of Physics (1901, 1908).

B. S., University of Chicago, 1900.

C 57; 331 N. Fourteenth.

MARY PIERCE VAN ZILE,

Dean of Women (1908, 1918).

L 41; 1318 Fremont.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering (1908, 1909).

B. S., Cornell College, 1904; C. E., *ibid.*, 1906; M. S., Lehigh University, 1908. E 32; 317 N. Seventeenth.

LESLIE ARTHUR FITZ, B. S.,

Professor of Milling Industry (1910, 1912).

B. S., 1902.

Ag 40; 1014 Houston.

EDWIN LEE HOLTON,¹ A. B.,

Professor of Education (1910, 1913); Dean of the Summer School (1910, Jan. 25, 1918).

A. B., Indiana University, 1904.

A 32; 217 N. Fourteenth.

ANDREY ABRAHAM POTTER, S. B.,

Dean of the Division of Engineering (1913, 1917); Director of the Engineering Experiment Station (1913, 1914); Professor of Steam and Gas Engineering (1905, 1910).

S. B., Massachusetts Institute of Technology, 1903.

E 30; 1328 Fremont.

ROY ANDREW SEATON,² M. S.,

Professor of Applied Mechanics and Machine Design (1904, 1914).

B. S., 1904; M. S., 1910; S. B., Massachusetts Institute of Technology, 1911.

S 61; 722 Humboldt.

JAMES WILLIAM SEARSON,¹ A. M.,

Professor of English (1910, 1911).

A. B., University of Nebraska, 1896; A. M., *ibid.*, 1899.

K 27; 1320 Fremont.

ARTHUR BOURNE SMITH, Ph. B., B. L. S.,

Librarian (1911).

Ph. B., Wesleyan University, 1900; B. L. S., University of Illinois, 1902.

F 32; R. R. 2.

WILLIAM ADAMS LIPPINCOTT, M. S.,

Professor of Poultry Husbandry (1912); Poultry Husbandman, Agricultural Experiment Station (1912).

A. B., Illinois College, 1903; B. S., Iowa State College, 1911; M. S., University of Wisconsin, 1917. Ag 38; 321 N. Eighteenth.

1. Absent on leave, 1918-'19.

2. Absent on leave, in military service, February 3 to December 20, 1918.

- LELAND DAVID BUSHNELL, M. S.,
Professor of Bacteriology (1909, 1912); Bacteriologist, Agricultural
Experiment Station (1909, 1912).
B. S., Michigan Agricultural College, 1905; M. S., University of Kansas, 1915.
V 54; 1414 Humboldt.
- BESSIE WEBB BIRDSALL,
Professor of Clothing and Textiles (1912).
Graduate, Drexel Institute, 1903. L 56; 1320 Fremont.
- LELAND EVERETT CALL,³ M. S.,
Professor of Agronomy (1907, 1913); Agronomist, Agricultural Ex-
periment Station (1907, 1913).
B. S. in Agr., Ohio State University, 1906; M. S., *ibid.*, 1912.
Ag 58; 223 N. Fourteenth.
- GEORGE ADAM DEAN, M. S.,
Professor of Entomology (1902, 1913); Entomologist, Agricultural
Experiment Station (1902, 1913).
B. S., 1895; M. S., 1905. F 52; 327 N. Seventeenth.
- ROBERT KIRKLAND NABOURS, Ph. D.,
Professor of Zoölogy (1910, 1913); Zoölogist, Agricultural Experi-
ment Station (1910, 1913); Curator of the Natural History Mu-
seum (1910).
Ed. B., University of Chicago, 1905; Ph. D., *ibid.*, 1911. F 54; 210 S. Tenth.
- LEONARD WHITTLESEY GOSS,⁴ D. V. M.,
Professor of Pathology (1905, 1913 – June 30, 1919).
D. V. M., Ohio State University, 1905.
- RALPH RALPH DYKSTRA, D. V. M.,
Professor of Veterinary Medicine (1911; March 1, 1919).
D. V. M., Iowa State College, 1905. V 31; 607 Houston.
- MARGARET HELEN HAGGART,⁴ A. M.,
Professor of Domestic Science (1914 – June 30, 1919).
B. S., 1905; A. M., Columbia University, 1914.
- CLARENCE ERLE REID, B. S.,
Professor of Electrical Engineering (1914).
B. S. in E. E., Purdue University, 1902. C 33; 421 N. Sixteenth.
- FRANCES LANGDON BROWN,⁸ A. B., B. S.,
State Leader of Emergency Home Demonstration Agents, Division of
College Extension (1909; Nov. 1, 1917).
B. S., 1909; A. B., Kansas State Normal School, 1910. A 35; 510 N. Ninth.
- EDWARD CARL JOHNSON,⁴ A. M.,
Dean of the Division of College Extension (1912, 1915 – Dec. 31, 1918).
A. B., University of Minnesota, 1906; A. M., *ibid.*, 1907.
A 33; 321 N. Fourteenth.
- MICHAEL FRANCIS AHEARN, M. S.,
Professor of Landscape Gardening (1904, 1915).
B. S., Massachusetts Agricultural College, 1904; M. S., 1913.
H 28; 110 N. Juliette.

3. Absent on leave since January 21, 1919.

4. Resigned.

8. In coöperation with the U. S. Department of Agriculture.

- NELSON ANTRIM CRAWFORD, A. M.,
 Professor of Industrial Journalism, and Superintendent of Printing
 (1910, 1915).
 A. B., State University of Iowa, 1910; A. M., University of Kansas, 1914.
 K 52; 221 N. Juliette.
- ARTHUR EDGAR WESTBROOK, A. B., B. Mus.,
 Director of Music and Professor of Voice (1915).
 A. B., Albion College, 1910; B. Mus., *ibid.*, 1911. M 30; 1446 Fairchild.
- JOHN ROBERTSON MACARTHUR, Ph. D.,
 Professor of English (1914, 1916).
 A. B., University of Manitoba, 1892; Ph. D., University of Chicago, 1903.
 K 27; 1126 Bluemont.
- ZORA GOODWIN CLEVENGER,
 Professor of Physical Education and Director of Athletics (1916).
 Graduate, Summer School of Physical Education and Athletics, Chautauqua, N. Y.,
 1905. N 35; 327 N. Fifteenth.
- CHARLES MOSES SIEVER, Ph. G., M. D.,
 College Physician (1916).
 Ph. G., Trinity University, 1903; M. D., *ibid.*, 1903; M. D., University of Kansas,
 1907. A 65; 1627 Anderson.
- ANDREW CLEVELAND HARTENBOWER, B. S.,
 Superintendent of Institutes and Extension Schools, Division of Col-
 lege Extension (July 1, 1917).
 B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905.
 A 34; College Heights.
- WALTER WILLIAM CARLSON, B. S., M. E.,
 Professor of Shop Practice (1910, 1917); Superintendent of Shops
 (1910, 1912).
 B. S., 1903; M. E., 1916. S 62; 1130 Bluemont.
- SAMUEL CECIL SALMON, B. S.,
 Professor of Farm Crops (1913, 1917).
 B. S., South Dakota Agricultural and Mechanical College, 1907.
 Ag 82; 1648 Leavenworth.
- JAMES GORDON EMERSON,⁵ J. D.,
 Professor of Public Speaking (1915, 1917).
- CECIL FRANKLIN BAKER, M. S.,
 Professor of Architecture (1917).
 A. B., University of Illinois, 1907; B. S., Massachusetts Institute of Technology, 1907;
 M. S., *ibid.*, 1909. E 57; 321 N. Eighteenth.
- KARL JOHN THEODORE EKBLAW,⁴ M. S., M. E.,
 Professor of Farm Engineering (1917–June 30, 1919).
 B. S., University of Illinois, 1909; M. S., *ibid.*, 1912; M. E., Yale University, 1917.
- ODIS HERSCHEL BURNS, A. B.,
 Professor of Public Speaking (Jan. 5, 1918).
 A. B., University of Kansas, 1916. G 56; 1615 Anderson.
- WALTER HORACE BURR,⁸
 Director of Rural Service, Division of College Extension (1914, 1915).
 A 37; 105 S. Juliette.

4. Resigned.

5. Absent on leave, in military service, since Jan. 5, 1918.

8. In coöperation with the U. S. Department of Agriculture.

- HARRY JOHN CHARLES UMBERGER,⁸ B. S.,
Acting Dean, Division of College Extension (Jan. 1, 1919); County
Agent Leader, Division of College Extension (1917).
B. S., 1905. A 2, 33; 419 N. Eighteenth.
- OTIS EARLE HALL,⁸ A. B.,
Director of Junior Extension Service, Division of College Extension
(1914).
A. B., Wabash College, 1907. A 35; 1220 Laramie.
- MARY WHITING MCFARLANE, M. S.,
State Leader of Home Economics Specialists, Division of College Ex-
tension (June 16, 1918).
B. S., University of Wyoming, 1894; M. S., Oregon Agricultural College, 1916.
A 36; 1335 Anderson.
- HERBERT HIRAM KING, Ph. D.,
Professor of Chemistry (1906; July 1, 1918); Chemist, Agricultural
Experiment Station (1918); Chemist, Engineering Experiment
Station (1909, 1918).
C 30; 916 Humboldt.
- CHARLES WILBUR McCAMPBELL, D. V. M.,
Professor of Animal Husbandry (1910; July 1, 1918); Animal Hus-
bandman, Agricultural Experiment Station (1910, 1918).
B. S., 1906; D. V. M., 1910; B. S. in Agr., 1918. Ag 8; 535 N. Manhattan.
- RAY IAMS THROCKMORTON, B. S.,
Professor of Soils (1911; July 1, 1918).
B. S., Pennsylvania State College, 1911. Ag 60; 825 Houston.
- JAMES EDWARD ACKERT, Ph. D.,
Professor of Zoölogy (1913; July 1, 1918); Parasitologist, Agricul-
tural Experiment Station (1913).
A. B., University of Illinois, 1909; A. M., *ibid.*, 1911; Ph. D., *ibid.*, 1913.
F 58; 1605 Humboldt.
- THEODORE MACKLIN, Ph. D.,
Professor of Agricultural Economics (1915; July 1, 1918).
B. S. A., Iowa State College, 1911; Ph. D., University of Wisconsin, 1917.
Ag 51A; 930 Vattier.
- ALFRED EVERETT WHITE, M. S.,
Professor of Mathematics (1909; Sept. 1, 1918).
B. S., Purdue University, 1904; M. S., *ibid.*, 1909. A 72; 1743 Fairchild.
- JAMES BURGESS FITCH, B. S.,
Professor of Dairy Husbandry (1910; Sept. 1, 1918); Dairy Husband-
man, Agricultural Experiment Station (1910, 1918).
B. S., Purdue University, 1910. D 30; 321 N. Sixteenth.
- HALLAM WALKER DAVIS, A. M.,
Professor of English (1913; Sept. 1, 1918).
A. B., Indiana University, 1909; A. M., Columbia University, 1913.
A 69; 532 N. Fourteenth.
- ARAMINTA HOLMAN,
Professor of Applied Art (1913; Sept. 1, 1918).
Graduate, Kansas State Normal School, 1890; Graduate, New York School of Fine
and Applied Art, 1912. A 67; 1636 Fairchild.

8. In coöperation with the U. S. Department of Agriculture.

FRANCIS DAVID FARRELL, B. S.,

Dean, Division of Agriculture (Sept. 1, 1918); Director, Agricultural Experiment Station (Sept. 1, 1918).

B. S., Utah Agricultural College, 1907.

Ag 34; 1007 Houston.

HELEN BISHOP THOMPSON, Ph. D.,

Dean, Division of Home Economics (Sept. 1, 1918); Professor of Nutrition and Dietetics (1918).

B. S., 1903; M. S., 1907; A. M., Columbia University, 1913; Ph. D., Yale University, 1917.

L 30; 1201 Moro.

VIVAN LEWIS STRICKLAND, A. M.,

Director of Home-study Service, Division of College Extension (1917; Oct. 1, 1918).

A. B., University of Nebraska, 1906; A. M., *ibid.*, 1915.

A 4; 1512 Leavenworth.

JAMES PARK CALDERHEAD, M. E., M. S.,

Professor of Steam and Gas Engineering (Dec. 1, 1918).

M. E., Ohio State University, 1908; M. S., Pennsylvania State College, 1916.

S 55; 1325 Anderson.

LEWIS CLARKE DAVIDSON, Major Inf., U. S. A.,

Professor of Military Science and Tactics, and Commandant of Cadets (Feb. 19, 1919).

Graduate, United States Military Academy, 1915.

N 24, 137 S. Delaware.

HILDEGARDE KNEELAND, A. B.,

Professor of Household Economics (Sept. 1, 1919).

A. B., Vassar College, 1911.

ASSOCIATE PROFESSORS

HARRY LLEWELLYN KENT, B. S.,

Associate Professor of Education (1911, 1913), in Charge (1918); Principal of School of Agriculture (1911, 1913).

A. B., Kansas State Normal School, 1912; B. S., 1913.

A 32, G 29; 321 Delaware.

WILLIAM HIDDLESON ANDREWS, A. B.,

Associate Professor of Education (1906, 1913).

A. B., University of Chicago, 1900.

A 64; 630 Moro.

CHARLES OSCAR SWANSON, M. Agr.,

Associate Professor of Agricultural Chemistry (1909, 1914); Associate Chemist, Agricultural Experiment Station (1906, 1914).

A. B., Carleton College, 1899; M. Agr., University of Minnesota, 1905.

C 6; 931 Bluemont.

HARRY BRUCE WALKER,⁷ B. S. in C. E.,

Associate Professor of Irrigation and Drainage Engineering (1914); Drainage and Irrigation Engineer, Division of College Extension (1910).

B. S., in C. E., Iowa State College, 1910.

IVOR VICTOR ILES, A. M.,

Associate Professor of History and Civics (1911, 1915).

A. B., University of Kansas, 1905; A. M., *ibid.*, 1905.

F 4; 1725 Fairchild.

7. Absent on leave, in military service, since Sept. 20, 1917.

- ROBERT HENRY BROWN, B. M.,
Associate Professor of Music (1900, 1916); Conductor of Orchestra
(1905).
B. M., Kansas Conservatory of Music, 1893; B. S., 1898.
M 29; 331 N. Seventeenth.
- JAMES HENRY BURT, D. V. M.,
Associate Professor of Veterinary Medicine (1909, 1916).
V. S., Ontario Veterinary College, 1895; D. V. M., Ohio State University, 1905.
V 32; 800 Poyntz.
- OLIVER WILLIAM HUNTER,⁹ M. S.,
Associate Professor of Bacteriology (1911, 1917).
B. S., 1909; M. S., University of Wisconsin, 1911.
- JONTA BOEN MARCELLUS, B. S. in C. E.,
Associate Professor of Irrigation and Drainage Engineering (1917);
Drainage and Irrigation Engineer, Division of College Extension
(1917).
B. S. in C. E., University of Kansas, 1904. E 32; 822 Vattier.
- PORTER JOSEPH NEWMAN, M. S.,
Associate Professor of Chemistry (1909, 1918).
B. S., Franklin College, 1908; M. S., *ibid.*, 1910. W 27; 914 Leavenworth.
- EDWARD GUERRANT KELLY, M. S.,
Specialist in Entomology, Division of College Extension (1918).
B. S., University of Kentucky, 1903; M. S., *ibid.*, 1904. F 54A; 600 Houston.
- JOSIAH SIMSON HUGHES, Ph. D.,
Associate Professor of Chemistry (1910; July 1, 1918).
B. S., Ohio Wesleyan University, 1908; M. S., *ibid.*, 1909; A. M., Ohio State Uni-
versity, 1910; Ph. D., *ibid.*, 1917. C 41; 344 N. Fifteenth.
- GRACE EMILY DERBY, A. B.,
Associate Librarian (1911; July 1, 1918).
A. B., Western College for Women, 1905. F 32; 1633 Fairchild.
- SIEBELT LUKE SIMMERING,⁴ M. S., M. E.,
Associate Professor of Steam and Gas Engineering (1914; July 1,
1918 - Oct. 15, 1918).
B. S., University of Colorado, 1910; M. E., *ibid.*, 1916; M. S., University of Illinois,
1913.
- LEO EDWARD MELCHERS, M. S.,
Associate Professor of Botany (1914; July 1, 1918), in Charge (1917).
B. S., Ohio State University, 1912; M. S., *ibid.*, 1913. H 58; 1801 Leavenworth.
- EDWIN CYRUS MILLER, Ph. D.,
Associate Professor of Plant Physiology (1910; July 1, 1918).
A. B., Lebanon College, 1906; A. B., Yale University, 1907; Ph. D., *ibid.*, 1910.
H 56; 501 Laramie.
- JAMES WALKER McCULLOCH, B. S.,
Associate Entomologist, Agricultural Experiment Station (1910;
July 1, 1918).
B. S., 1912. F 64; 1626 Leavenworth.

4. Resigned.

9. Absent in military service, Jan. 1, 1918, to May 31, 1919.

- HOWARD W. BRUBAKER, Ph. D.,
Associate Professor of Chemistry (1913; Sept. 1, 1918).
B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904.
C 64; 1116 Fremont.
- INA FOOTE COWLES, B. S.,
Associate Professor of Clothing and Textiles (1902; Sept. 1, 1918).
B. S., 1901. L 55; 1021 Houston.
- RAYMOND GARFIELD TAYLOR,¹⁰ A. M.,
Associate Professor of History and Civics (1910; Sept. 1, 1918 – Oct. 14, 1918).
A. B., University of Kansas, 1907; A. M., University of Chicago, 1915.
- MARY THERESA HARMAN, Ph. D.,
Associate Professor of Zoölogy (1912; Sept. 1, 1918).
A. B., Indiana University, 1907; A. M., *ibid.*, 1909; Ph. D., *ibid.*, 1912.
F 62; 1430 Poyntz.
- GEORGE ELLSWORTH RABURN, M. S.,
Associate Professor of Physics (1910; Sept. 1, 1918).
A. B., University of Michigan, 1907; M. S., *ibid.*, 1913. C 61; 1014 Bluemont.
- ROBERT WARREN CONOVER, A. M.,
Associate Professor of English (1915; Sept. 1, 1918).
A. B., Wesleyan University, 1911; A. M., *ibid.*, 1914. A 58; 319 N. Sixteenth.
- MAURICE COLE TANQUARY, Ph. D.,
Associate Professor of Entomology (1912; Sept. 1, 1918); Associate Entomologist, Agricultural Experiment Station (1912; Sept. 1, 1918).
A. B., University of Illinois, 1907; A. M., *ibid.*, 1908; Ph. D., *ibid.*, 1912.
F 64; R. R. 1.
- WYLIE BRODBECK WENDT, B. C. E.,
Associate Professor of Applied Mechanics and Machine Design (1916; Sept. 1, 1918).
B. C. E., University of Kentucky, 1906. E 8A; 1623 Anderson.
- FRED D. MERRITT, Ph. D.,
Associate Professor of Sociology and Economics (1917; Sept. 1, 1918).
B. S., Upper Iowa University, 1891; A. M., University of Iowa, 1898; Ph. D., *ibid.*, 1900.
A 59; 1634 Osage.
- FLOYD WAYNE BELL, B. S. A.,
Associate Professor of Animal Husbandry (Sept. 1, 1918).
B. S. A., Cornell University, 1911. Ag 5; 916 Osage.
- BURNS OSCAR SEVERSON,¹⁰ M. S.,
Associate Professor of Animal Husbandry (Sept. 1 – Dec. 4, 1918).
B. S., University of Wisconsin, 1910; M. S., Pennsylvania State College, 1915.
- EUSTACE VIVIAN FLOYD,²³ B. S.,
Associate Professor of Physics (1911; Oct. 1, 1918).
B. S., Earlham College, 1903. C 57; 1417 Laramie.
- EVAN F. FERRIN, B. S.,
Associate Professor of Animal Husbandry (Nov. 15, 1918).
B. S. in A. H., Iowa State College, 1911. Ag 13; 1511 Leavenworth.

10. Deceased.

23. Absent on leave, 1919-'20.

CHARLES E. ROGERS,

Associate Professor of Industrial Journalism (July 1, 1919).

RUDOLPH L. HENSEL, B. S. F.,

Associate Professor of Pasture Management (July 15, 1919).

B. S. F., Iowa State College, 1913.

ELLEN ANN REYNOLDS, M. S., A. M.,

Associate Professor of Household Economics (Sept. 1, 1919).

B. S., University of Kentucky, 1895; M. S., *ibid.*, 1896; A. M., University of Chicago, 1919.

ASSISTANT PROFESSORS

WILMER ESLA DAVIS, A. B.,

Assistant Professor of Botany (1909).

Graduate, Ohio Normal University, 1894; A. B., University of Illinois, 1903.
H 76; 350 N. Sixteenth.

WILLIAM TIMOTHY STRATTON, A. M.,

Assistant Professor of Mathematics (1910, 1914).

A. B., Indiana University, 1906; A. M., *ibid.*, 1913. A 70; 1020 Vattier.

EDGAR LEMUEL TAGUE, A. M.,

Assistant Professor of Chemistry (1914); Assistant in Protein Chemistry Agricultural Experiment Station (1914).

A. B., University of Kansas, 1908; A. M., *ibid.*, 1909. C 3; 617 N. Manhattan.

WALDO ERNEST GRIMES, B. S.,

Assistant Professor of Farm Management (1913, 1915).

B. S., 1913. Ag 60; 1739 Fairchild.

ADA RICE, M. S.,

Assistant Professor of English (1899, 1915).

B. S., 1895; M. S., 1912. G 28; 917 Osage.

ELDEN VALORIUS JAMES, A. M.,

Assistant Professor of History and Civics (1912, 1915).

A. B., Marietta College, 1901; A. B., University of Michigan, 1905; A. M., Marietta College, 1908. F 1; 621 Humboldt.

JOSEPH HENRY MERRILL, Ph. D.,

Assistant Professor of Entomology (1912, 1915); Assistant Entomologist, Agricultural Experiment Station (1912).

B. S., Dartmouth College, 1905; Ph. D., Massachusetts Agricultural College, 1914.
F 52; 626 Moro.

FORREST FAYE FRAZIER, C. E.,

Assistant Professor of Civil Engineering (1911, 1915).

C. E., Ohio State University, 1910. E 55; 915 Fremont.

CLAUDE CARROLL CUNNINGHAM, B. S.,

Assistant Professor of Agronomy (1907, 1918).

B. S., 1903. Ag 60; 1026 Fremont.

MALCOLM C. SEWELL, M. S.,

Assistant Professor of Soils (1914, 1915).

B. S., 1912; M. S., Ohio State University, 1914. Ag 60; 530 N. Fourteenth.

- ALBERT GARLAND HOGAN,¹¹ Ph. D.,
 Assistant Professor of Chemistry, Agricultural Experiment Station
 (1914, 1916).
 A. B., University of Missouri, 1907; B. S., *ibid.*, 1909; A. M., *ibid.*, 1912; Ph. D.,
 Yale University, 1914.
- ROYCE GERALD KLOEFFLER, B. S.,
 Assistant Professor of Electrical Engineering (1916).
 B. S. in E. E., University of Michigan, 1913. C 33; 831 Vattier.
- ADOLPH GEORGE SCHULZ,
 Assistant Professor of Athletics and Assistant Coach (1916).
 Student, University of Michigan, 1904-'08. N 35; 308 N. Sixteenth.
- CLINTON ELLICOTT PEARCE, S. B.,
 Assistant Professor of Applied Mechanics and Machine Design (1917).
 S. B., Massachusetts Institute of Technology, 1913. S 63; 615 N. Eleventh.
- GEORGE MERRITT POTTER, D. V. M.,
 Specialist in Veterinary Medicine, Division of College Extension
 (1917).
 D. V. M., Ohio State University, 1906. V 27; 1615 Anderson.
- ROSS MADISON SHERWOOD, B. S.,
 Specialist in Poultry Husbandry, Division of College Extension
 (1914).
 B. S. in A. H., Iowa State College, 1910. Ag 38; 1019 Houston.
- LEILA DUNTON, M. S.,
 Assistant Professor of Milling Industry (1912, 1917).
 B. S., 1910; M. S., 1912. Ag 40; 325 N. Seventeenth.
- JEN LYNN COX,⁴ B. S.,
 Assistant Professor of Domestic Science (1913, 1917 – June 30, 1919).
 A. B., Fairmount College, 1903; B. S., 1913.
- PERCY LEIGH GAINES,¹² A. M., M. S.,
 Assistant Professor of Bacteriology (1914, 1917); Soil Bacteriologist,
 Agricultural Experiment Station (1914).
 B. Agr., North Carolina College of Agriculture and Mechanic Arts, 1908; M. S., *ibid.*,
 1910; A. M., Washington University, 1911. V 26; 1610 Laramie.
- LOULA ESDALE KENNEDY,* A. B., R. N.,
 Assistant Professor of Domestic Science (1915; 1917 – Feb. 4, 1919).
 A. B., Goucher College, 1896; Graduate, Johns Hopkins Hospital Training School for
 Nurses, 1903; R. N., Maryland, 1905.
- DON LAMAR BURK,¹⁰ A. M.,
 Assistant Professor of English (1916; 1917 – Dec. 16, 1918).
 A. B., DePauw University, 1914; A. M., *ibid.*, 1915.
- ANDREW MINIE PATERSON, B. S.,
 Assistant Professor of Animal Husbandry (1913, 1917).
 B. S., 1913. Ag 13; 1320 Fremont.

* Absent on leave, 1918-'19; resigned.

4. Resigned.

10. Deceased.

11. Absent on leave, in military service, since Dec. 1, 1917.

12. Absent on leave, in military service, Nov. 1, 1918, to Jan. 1, 1919.

- ELIZABETH MACLEAN, Ph. B., M. Di.,
Assistant Professor of English (1916, 1917).
B. Di., Iowa State Teachers' College, 1894; M. Di., *ibid.*, 1900; Ph. B., University of Chicago, 1909. A 54; 1818 Fremont.
- HENRY HUXLEY FENTON, B. S.,
Specialist in Industrial Subjects, Home Study Service, Division of College Extension (1917).
B. S. in E. E., 1913. A 5; 1449 Laramie.
- JOHN CHRISTIAN PETERSON, Ph. D.,
Assistant Professor of Education (1917).
A. B., University of Utah, 1913; Ph. D., University of Chicago, 1917. A 66; 1622 Osage.
- JOHN HUNTINGTON PARKER,¹³ M. S.,
Assistant Professor of Farm Crops (1917).
B. S. in Agr., University of Minnesota, 1913; M. S. in Agr., Cornell University, 1916. Ag 77; 1809 Leavenworth.
- GEORGE E. PIPER, B. S.,
Assistant County Agent Leader, Division of College Extension (1917).
B. S., Michigan Agricultural College, 1916. A 2; 321 N. Fourteenth.
- HARLEY JAMES BOWER,⁸ M. S.,
Specialist in Soils, Division of College Extension (1913, 1917).
B. S., 1910; M. S., Ohio State University, 1912. Ag 60; 419 Leavenworth.
- EARL ARTHUR STEWART, B. S.,
Assistant Professor of Physics (1918).
B. S., University of Chicago, 1915; B. Pd., Michigan State Normal College, 1910. C 36; College Hill.
- WALTER LEROY LATSHAW, B. S.,
Assistant Professor of Chemistry (1914; July 1, 1918).
B. S., Pennsylvania State College, 1912. C 3; 917 Fremont.
- NORMAN EVERETT OLSON, B. S.,
Assistant Professor of Dairy Husbandry (Aug. 1, 1918).
B. S., Iowa State College, 1915. D 30; 319 N. Sixteenth.
- WILLIAM HENRY SANDERS, M. E.,
Assistant Professor of Farm Engineering (1914; Sept. 1, 1918).
B. S., 1890; M. E., 1916. Tractor Lab.; N. Manhattan.
- JOHN EARL SMITH,¹⁴ A. M.,
Assistant Professor of Physics (1915; Sept. 1, 1918).
A. B., Indiana University, 1912; A. M., University of Wisconsin, 1915. C 38; 601 Vattier.
- JAMES WALTER ZAHNLEY, B. S.,
Assistant Professor of Education (1915; Sept. 1, 1918); Acting Principal, School of Agriculture (1917; Sept. 1, 1918).
B. S., 1909; B. S. in Agr., 1918. Ag 79; 1131 Laramie.
- ETHEL MAY LORING,⁴
Assistant Professor in Charge of Physical Education for Women (1915; Sept. 1, 1918 – June 30, 1919).
Graduate, Sargent Normal School of Physical Education, 1915.

4. Resigned.

8. In coöperation with the U. S. Department of Agriculture.

13. Absent on leave, Oct. 15 to Dec. 31, 1918.

14. Absent on leave, in military service, Sept. 1 to Dec. 31, 1918.

- HARRY WINFIELD CAVE, M. S.,
Assistant Professor of Dairy Husbandry (1918).
B. S. A., Iowa State College, 1914; M. S., 1916. D 30; 217 N. Fourteenth.
- ALICE LLOYD-JONES, M. S.,
Assistant Professor of Clothing and Textiles (1918; Feb. 1, 1919);
Assistant Professor of Education (Sept. 1, 1918–Feb. 1, 1919).
B. S., University of Wisconsin, 1911; M. S., *ibid.*, 1918. L 64; 331 N. Seventeenth.
- CLYDE WILLIAM MULLEN, M. S.,
Assistant Professor of Farm Crops (Sept. 8, 1918); Barton County
Agricultural Agent, Division of College Extension (April 16,
1918–Sept. 8, 1918).
B. S., Oklahoma College of Agriculture and Mechanic Arts, 1915; M. S., 1917.
Ag 82; 1131 Laramie.
- CARL G. ELLING,⁸ B. S.,
Specialist in Animal Husbandry, Division of College Extension (Oct.
1, 1918).
B. S., 1904. A 33; R. R. 1.
- ELIZABETH ROTHERMEL, A. M.,
Assistant Professor of Food Economics and Nutrition (Oct. 1, 1918).
A. B., University of California, 1899; A. M., Columbia University, 1913.
L 35; 1641 Fairchild.
- PAUL PORTER BRAINARD, A. M.,
Specialist in Educational Subjects, Home Study Service, Division of
College Extension (Jan. 6, 1919).
B. L., Whitman College, 1909; A. M., Columbia University, 1913.
A 5; 1623 Anderson.
- HARRY BURDETT WINCHESTER, M. S.,
Assistant Professor of Animal Husbandry (Jan. 15, 1919).
B. S., Iowa State College, 1916; M. S., *ibid.*, 1917. Ag 13; 1623 Anderson.
- PRESTON ESSEX McNALL, M. S.,
Specialist in Farm Management Studies, Division of College Extension
(1913; Feb. 1, 1919).
B. S. in E. E., 1909; B. S. in Agr., 1913; M. S., 1914. A 2; 817 Osage.
- ALONZO FRANKLIN TURNER,⁸ B. S.,
Assistant County Agent Leader, Division of College Extension (1917;
Feb. 1, 1919).
B. S., 1905. A 2; 810 Moro.
- KARL KNAUS,⁸ B. S.,
Assistant County Agent Leader, Division of College Extension (1916;
Feb. 1, 1919).
B. S., 1914. A 2; 519 N. Manhattan.
- RALPH LEO KEMPER, Capt., Inf., U. S. A.,
Assistant Commandant (May 13, 1918; Feb. 21, 1919); Acting Com-
mandant (Jan. 2–Feb. 21, 1919).
A. B., Ohio State University, 1917. N 27; 1623 Anderson.
- HAROLD MORTON JONES, B. S.,
Acting State Dairy Commissioner (1913; Mch. 6, 1919).
B. S., Purdue University, 1908. X; 1212 Fremont.

8. In coöperation with the U. S. Department of Agriculture.

CHARLES HENRY SHOLER, B. S.,
Testing Engineer (April 16, 1919).
B. S., 1914.

VERNON H. KERN,
Assistant Professor of Farm Engineering (Sept. 1, 1919).

ARTHUR FREDERICK PEINE, A. M.,
Assistant Professor of History and Civics (Sept. 1, 1919).
A. B., Illinois Wesleyan University, 1911; A. M., University of Illinois, 1913.

MARTHA S. PITTMAN, A. M.,
Assistant Professor of Food Economics and Nutrition (Sept. 1, 1919).
B. S., 1906; B. S., Teachers' College, Columbia University; A. M., Columbia University, 1918.

ASSOCIATES

WILLIAM SYLVANUS STEVENS,¹⁵ B. Sc. Pharm.,
Associate in Stock Remedy Analysis, Agricultural Experiment Station (1917 – May 7, 1919).
B. Sc. Pharm., Ohio State University, 1917.

RALPH B. WAITE,⁴
Associate in Food Analysis (May 1 – Nov. 1, 1918).

FRANK SWARTZ CAMPBELL, B. S.,
Associate in Food Analysis (Feb. 10, 1919).
B. S., 1919. W 30; 1819 Humboldt.

INSTRUCTORS

ANNETTE LEONARD, A. B.,
Instructor in English (1907, 1909).
A. B., University of Kansas, 1906. G 27; 337 N. Fourteenth.

WILLIAM LEONARD HOUSE,
Instructor in Wood Work (1909); Foreman of Carpenter Shop (1888).
S 29; 608 Moro.

EDWARD GRANT,
Instructor in Molding (1913); Foreman of Foundry (1913).
S 42; 1733 Laramie.

CHARLES WESLEY HOBBS, D. V. S.,
Instructor in Veterinary Medicine (1913).
D. V. S., Western Veterinary College, Kansas City, Mo., 1901.
V 27; 303 N. Sixteenth.

CONSTANCE MIRIAM SYFORD,¹ A. M.,
Instructor in English (1913).
A. B., University of Nebraska, 1909; A. M., *ibid.*, 1911.

ARTHUR ROY FEHN, Ph. B.,
Instructor in Mathematics (1910, 1913).
Ph. B., Baldwin Wallace College, 1903. A 70; 1506 Poyntz.

1. Absent on leave, 1918-'19.

4. Resigned.

15. Absent on leave, in military service, since May 1, 1918. Resigned.

- LOUIS HENRY LIMPER, A. M.,
Instructor in Modern Languages (1914, 1917).
A. B., Baldwin Wallace College, 1907; A. M., University of Wisconsin, 1914.
N 61; 1324 Laramie.
- INA EMMA HOLROYD, B. S.,
Instructor in Mathematics (1900, 1914).
B. S., 1897; B. S., Kansas State Normal School, 1916. G 28; 1001 Moro.
- EMMA FLORA FECHT,
Instructor in Clothing and Textiles (1913, 1914).
Graduate, Bradley Polytechnic Institute, 1912. L 55; 1623 Fairchild.
- DANIEL EMMETT LYNCH,
Instructor in Forging (1914); Foreman of Blacksmith Shop (1914).
S 38; 913 Osage.
- ALICE EDNA SKINNER,¹ B. S.,
Instructor in Domestic Science (1910, 1915).
B. S., 1909. L 42; 1314 Fremont.
- HELEN LOUISE GREEN, B. S.,
Instructor in Domestic Science (1912, 1916).
B. S., Simmons College, 1915. L 42; 1516 Leavenworth.
- EDWARD C. JONES, B. M. E.,
Instructor in Shop Practice (1916).
B. M. E., Iowa State College, 1905. S 31; 923 Osage.
- DANIEL WALTER ZIEGLER,⁴ B. S.,
Specialist in Animal Husbandry, Home Study Service, Division of College Extension (1916 – April 30, 1919).
B. S., 1913.
- LOTTIE MILAM, B. S.,
Assistant Club Leader, Boys' and Girls' Club Work, Division of College Extension (1917).
B. S., Oregon Agricultural College, 1914. A 35; 1419 Laramie.
- WILLIAM EARL PETERSON,⁸ M. S.,
Specialist in Dairy Husbandry, Division of College Extension (1917).
B. S. in Agr., University of Minnesota, 1916; M. S., *ibid.*, 1917.
D 30; 515 Bluemont.
- JOHN THOMPSON PARKER,
Instructor in Woodwork (1906, 1917).
S 26; 926 Vattier.
- GRACE CUSHING AVERILL,
Instructor in Applied Art (1913, 1917).
Graduate, Wisconsin State Normal School, 1906. A 68; 1412 Leavenworth.
- WILLIAM HENRY BALL,¹⁰
Instructor in Woodwork (1913, 1917 – Oct. 17, 1918).
- STANLEY ALBERT SMITH, B. S.,
Instructor in Architecture (1913, 1917).
B. S., 1913. E 58B; 812 Laramie.

1. Absent on leave, 1918-'19.

4. Resigned.

8. In cooperation with the U. S. Department of Agriculture.

10. Deceased.

- AVA PATRICIA ABERNATHY,⁴
Instructor in Piano (1915, 1917 – June 30, 1919).
Graduate, Laurence Conservatory, Appleton, Wis., 1911.
- EDGAR TALBERT KEITH, B. S.,
Instructor in Printing (1912, 1917).
B. S., 1912. K 1; 1421 Poyntz.
- LOUIS COLEMAN WILLIAMS, B. S.,
Assistant Club Leader, Division of College Extension (1915, 1917).
B. S., 1912. A 34; 1110 Vattier.
- MINNIE SEQUIST, A. B.,
Specialist in Home Economics, Division of College Extension (1916).
A. B., Kansas State Normal School; Graduate, Stout Institute, 1916.
A 36; 1020 Leavenworth.
- JULIA MARGARET BAKER ALDER, B. S.,
Specialist in English and History, Home Study Service, Division of
College Extension (1917).
B. S., 1914; Graduate, Kansas State Normal School, 1912. A 5; 1020 Vattier.
- DORIS MARJORIE BUGBEY, Mus. B.,
Instructor in Violin (1917).
Mus. B., Conservatory of Music, Oberlin College, 1916. M 4; 331 N. Fourteenth.
- EULA BERNICE BUTZERIN,¹⁶ R. N.,
Specialist in Home Economics, Division of College Extension (1917).
R. N., School for Nurses, Presbyterian Hospital, Chicago, 1914.
- MANFORD W. FURR, B. S.,
Instructor in Highway Engineering (1917).
B. S. in C. E., Purdue University, 1913. E 55; 816 Pierre.
- JOHN B. GINGERY, D. V. M.,
Instructor in Veterinary Medicine (1917).
D. V. M., 1910. V 29; 1030 Bluemont.
- RAY WILLIAM HAZLETT, A. M.,
Instructor in English (1917); Instructor in Radio (June 1 – Nov. 1,
1918).
A. B., Oberlin College, 1915; A. M., *ibid.*, 1916. A 69; 1621 Anderson.
- PAUL REVERE IMEL,* B. S.,
Specialist in Pig and Baby Beef Club Work, Division of College Ex-
tension (1917).
B. S., Purdue University, 1917. A 35; 1621 Anderson.
- HERBERT FREDERICK LIENHARDT,¹⁷ D. V. M.,
Instructor in Bacteriology (1917).
D. V. M., University of Pennsylvania, 1916.
- FLORA SERAPHINE MONROE,⁴ B. S.,
Cafeteria Director (1917 – June 30, 1919).
B. S., 1914.

* Absent in military service, July 10, 1918, to Mch. 31, 1919.

4. Resigned.

16. Absent on leave, in military service, since June 1, 1918.

17. Absent on leave, in military service, July 11, 1918, to May 31, 1919.

- WILMA OREM, A. M.,
Instructor in History and Civics (1917).
B. S., 1910; A. M., University of Michigan, 1916. G 28; R. R. 3.
- MARGARET RUSSEL, A. M.,
Instructor in English (1917).
A. B., Washburn College, 1913; A. M., Columbia University, 1915.
A 54; 1723 Fairchild.
- ELSIE HARRIET SMITH,
Instructor in Piano (1917).
Graduate, Certificate Course, Chicago Musical College, 1909. M 58; 1314 Fremont.
- ALBERT JOHN MACK,¹⁸ B. S.,
Instructor in Steam and Gas Engineering (1917).
B. S., 1912. E 53; 805 Laramie.
- SUSANNA SCHNEMAYER, B. S.,
Specialist in Home Economics, Extension Schools, Division of College
Extension (1917).
B. S., 1909. A 36; 510 N. Ninth.
- CLIFFORD W. JOHNSTON,
Instructor in Voice (1917).
M 51; R. R. 2.
- RICHARD ANTHONY MUTTKOWSKI,¹⁹ Ph. D.,
Instructor in Zoölogy (1917); Assistant Zoölogist, Agricultural Ex-
periment Station (1917).
A. B., St. Lawrence College, 1905; A. B., University of Wisconsin, 1913; Ph. D.,
ibid., 1916.
- ERNEST H. WIEGAND,⁴ B. S. A.,
Specialist in Poultry Club Work, Division of College Extension (1917 –
May 1, 1919).
B. S. A., University of Missouri, 1914.
- KATHERINE KIMMEL,
Instructor in Voice (1917).
Graduate, Battle Creek (Mich.) Conservatory of Music, 1913. M 52; 1314 Fremont.
- JAMES WILLIAM CRUMBAKER,⁴ B. S.,
Instructor in Animal Husbandry (1916, 1917 – Mch. 15, 1919); Super-
intendent of Land and Livestock (1916, 1917 – Mch. 15, 1919).
B. S., 1916.
- HERBERT HENLEY HAYMAKER, M. S.,
Instructor in Botany (1917).
B. S., 1915; M. S., University of Wisconsin, 1916. H 54; 315 N. Sixteenth.
- LASSIE LANE,
Specialist in Extension Schools, Division of College Extension (1918).
A 36; 1642 Fairchild.

4. Resigned.

18. Absent on leave, in military service, Aug. 1 to Dec. 31, 1918.

19. Absent on leave, in military service, since Sept. 1, 1918.

- GERTRUDE LYNN,
Specialist in Institutes in Home Economics, Division of College Extension (1918).
Graduate, Kansas Manual Training Normal School, 1907.
A 36; 1020 Leavenworth.
- RENA AURELIA FAUBION,⁸ B. S.,
Specialist in Institutes in Home Economics, Division of College Extension (1918).
B. S., 1910.
A 36; 1419 Laramie.
- ROLLA WILLIAMS TITUS,⁴ A. M.
Assistant Chemist, Agricultural Experiment Station (1917, 1918; Oct. 1, 1918).
A. B., Washburn College, 1909; A. M., University of Kansas, 1914.
- ROY WILLIAM KISER,⁸ B. S.,
Specialist in Animal Husbandry, Division of College Extension (1918).
B. S., 1914.
A 34; 1635 Fairchild.
- RUTH MARION MATEER,⁴ B. S.,
Assistant Club Leader, Boys' and Girls' Club Work, Division of College Extension (Apr. 1, 1918 – Mar. 31, 1919).
B. S., Oregon Agricultural College, 1916.
- HAROLD SIMONDS, A. B.,
Specialist in Horticulture, Division of College Extension (May 5, 1918).
B. S., Washington State College, 1916.
H 26; 930 Moro.
- FRANK ELMER FOX, B. S.
Instructor in Poultry Husbandry (1916; July 1, 1918).
B. S., Iowa State College, 1915.
Ag 38; 1821 Poyntz.
- GEORGE GEMMELL, B. S.,
Specialist in Agriculture, Home Study Service, Division of College Extension (Aug. 1, 1918).
B. S., Kansas Manual Training Normal School, 1917.
A 4; 411 N. Sixteenth.
- FLORENCE TANNER ACKERT,⁶ A. B.,
Instructor in Domestic Science (Sept. 1, 1918).
A. B., University of Illinois, 1912.
L 42; 1422 Poyntz.
- JOSEPHINE CARRIER PERRY, B. S.,
Instructor in Domestic Science (1916; Sept. 1, 1918).
B. S., Simmons College, 1914.
L 34; 1314 Fremont.
- EDWARD STAUNTON WEST, A. B.,
Instructor in Chemistry (1917; Sept. 1, 1918).
A. B., Randolph Macon College, 917.
C 64; 1623 Anderson.
- RALPH KENNEY, B. S. A.,
Specialist in Crops, Division of College Extension (1917; Sept. 1, 1918).
B. S. A., Ohio State University, 1912.
Ag 59; 1201 Moro.

4. Resigned.

6. Temporary appointment.

8. In coöperation with the U. S. Department of Agriculture.

- STELLA MAUDE HARRISS, B. S.,
Instructor in Chemistry (1917; Sept. 1, 1918).
B. S., 1917; Graduate, Nebraska State Normal School, Peru, Neb., 1908.
W 26; 804 Moro.
- LOIS EMILY WITHAM, M. S.,
Instructor in Bacteriology (1917; Sept. 1, 1918).
B. S., 1916; M. S., 1918. V 53; 1324 Laramie.
- THOMAS ARTHUR CASE, D. V. M.,
Specialist in Veterinary Medicine, Division of College Extension (Sept. 1, 1918).
D. V. M., 1912. V 27; 1623 Anderson.
- NORA ELIZABETH DALBEY, A. M.,
Instructor in Botany (Sept. 1, 1918).
A. B., University of Kansas, 1913; A. M., *ibid.*, 1914. H 54; 350 N. Sixteenth.
- ODESSA DELLA DOW, B. S.,
Instructor in Chemistry (Sept. 1, 1918).
B. S., 1906. C 64; R. R. 1.
- FLORENCE MABELLE HEIZER, A. B.,
Instructor in English (Sept. 1, 1918).
A. B., Bethany College, 1907; A. B., University of Kansas, 1910.
A 53; 703 Poyntz.
- ERNEST BAKER KEITH, B. S.,
Instructor in Chemistry (Sept. 1, 1918).
B. S., 1913. W 26; 1031 Humboldt.
- ELIAS WARD MARKLE, B. S.,
Instructor in Electrical Engineering (Sept. 1, 1918).
B. S. in E. E., Pennsylvania State College, 1913. C 33; 1709 Laramie.
- ELVIRA THRALL SMITH,⁶ B. S.,
Instructor in Domestic Science (Sept. 1, 1918).
A. B., Ohio State University, 1912; B. S., *ibid.*, 1913. L 34; 1409 Anderson.
- IZIL ISABEL POLSON,⁶ B. S.,
Instructor in Industrial Journalism (Sept. 7, 1918).
B. S., 1916. K 59; 1334 Fremont.
- BESS JANE MCKITTRICK, A. B.,
Instructor in Mathematics (Sept. 15, 1918).
A. B., University of Kentucky, 1912. G 28A; 1636 Fairchild.
- MARY DAVIS NABOURS,⁶ B. S.,
Instructor in Domestic Science (Sept. 16, 1918 – Jan. 25, 1919).
B. S., Ohio State University, 1913.
- ALICE LENORE BROWN, A. B.,
Instructor in Zoölogy (Sept. 19, 1918).
A. B., University of Kansas, 1916. F 61; 350 N. Sixteenth.

6. Temporary appointment.

LAURA INCH WINTER,⁴

Specialist in Home Nursing, Division of College Extension (Sept. 23, 1918 – June 1, 1919).

KATHERINE MAXWELL BOWER, B. S.,

Specialist in Home Economics, Home Study Service, Division of College Extension (Oct. 1, 1918).

B. S., 1915.

A 5; 1637 Osage.

HARRY ELKINS DODGE, B. S.,

Specialist in Dairying, Division of College Extension (Oct. 1, 1918).

B. S. in D. H., 1918.

D 34; 1612 Osage.

CHARLES FREDERICK JOHNSON, B. S.,

Specialist in Hog Production, Division of College Extension (Oct. 1, 1918).

B. S., 1905.

Ag 13A; 508 Bluemont.

LEON VINCENT WHITE, B. S., C. E.,

Instructor in Civil Engineering (Oct. 7, 1918).

B. S., 1903; C. E., 1918.

E 8A; 1733 Anderson.

JESSIE REYNOLDS ANDREWS,⁶ A. B.,

Instructor in History and Civics (Nov. 1, 1918 – July 1, 1919).

A. B., University of Kansas, 1905; B. S., 1906.

A 64; 630 Moro.

GEORGE CLAMMER,⁶ A. B.,

Instructor in History and Civics (Nov. 1, 1918 – Feb. 8, 1919).

A. B., Simpson College, 1895.

ALICE ACKERT DOISY, B. S.,

Instructor in Chemistry (Nov. 1, 1918).

B. S., University of Illinois, 1918.

W 26; 1605 Humboldt.

ALVIN RUDOLPH SPRINGER,⁶ LL. D.,

Instructor in History and Civics (Nov. 1, 1918 – Feb. 8, 1919).

LL. B., University of Kansas, 1900.

F 3; 1016 Leavenworth.

IRA EARL TAYLOR, C. E.,

Assistant Drainage and Irrigation Engineer, Division of College Extension (Dec. 9, 1918).

B. S. in C. E., 1913; C. E., 1918.

E 32C; 110 S. Seventeenth.

FRED HARRISON BUNDY,

Instructor in Shop Practice (1916; Jan. 1, 1919).

S 31; 1008 Ratone.

LOWELL EDWIN BALDWIN,⁶

Instructor in Automobiles (May 1, 1918; Jan. 1, 1919).

E 52; 606 Laramie.

WILHELMINA ELIZABETH RANDALL BURK,⁶ A. B.,

Instructor in English (Jan. 1, 1919).

A. B., DePauw University, 1914.

A 53; 1721 Anderson.

4. Resigned.

6. Temporary appointment.

W. PEARL MARTIN,⁴

Specialist in Home Nursing, Division of College Extension (Jan. 1 – Feb. 22, 1919).

Graduate, Christ Hospital, Topeka.

HERBERT C. STROM,⁶

Instructor in Automobiles (Sept. 3, 1918; Jan. 1, 1919).

S 62; 1209 Poyntz.

LILLIE CILLEY, B. L. S.,

Head Cataloguer in Library (Feb. 1, 1919); General Assistant in Library (Sept. 1, 1918 – Feb. 1, 1919).

A. B., Grinnell College, 1914; B. L. S., University of Illinois, 1917.

F 27; 1725 Fairchild.

ARTHUR ERSKINE McCLYMONDS, B. S.,

Specialist in Crops, Division of College Extension (Feb. 3, 1919).

B. S. in Ag., 1915.

Ag 59; 1127 Laramie.

LYNDELL PORTER WHITEHEAD,⁶ B. S.,

Instructor in Zoölogy (Feb. 27 – June 10, 1919).

B. S., 1916.

MARY MATTIE McDONALD, Ph. B.,

Instructor in Clothing and Textiles (1916; Mch. 1, 1919).

Ph. D., University of Chicago, 1916; Graduate, Eastern Illinois State Normal School, 1910; Graduate, Bradley Polytechnic Institute, 1912.

L 64; 1631 Fairchild.

MOLLIE GOLD, B. S.,

Assistant State Leader of Emergency Home Demonstration Agents, Division of College Extension (Mch. 1, 1919).

B. S., Teachers' College, Columbia University, 1917.

A 36; 1409 Anderson.

JOHN M. GLEISSNER,⁶

Instructor in Industrial Journalism and Printing (Mch. 10 – July 1, 1919).

A. B., University of Kansas, 1916.

DELLA STROUD,

Assistant State Leader of Emergency Home Demonstration Agents, Division of College Extension (Mch. 1, 1919).

AUBREY DEAKENS CONROW, B. S.,

Assistant Testing Engineer (Mch. 17, 1919).

B. S., 1913.

E 8; R. R. 1.

CLIFF ERRETT AUBEL, M. S.,

Instructor in Animal Husbandry (Apr. 1, 1919).

B. S., Pennsylvania State College, 1915; M. S., 1917.

MABEL C. PETERS,⁶ B. S.,

Instructor in Food Economics and Nutrition (June 6 – Aug. 8, 1919).

4. Resigned.

6. Temporary appointment.

MARY WINONA WARD,

Instructor in Household Economics and Director of the Cafeteria (1917; July 1, 1919); Assistant Leader of Emergency Home Demonstration Agents, Division of College Extension (1917; Sept. 1, 1918 - Feb. 15, 1919).

ASSISTANTS

AMY ALENA ALLEN,²² B. S.,

Assistant in Printing (1900, 1909).

B. S., 1904.

K 3; 1446 Fairchild.

JESSIE GULICK,

Assistant Cataloguer in Library (1907, 1911).

F. 27; 421 N. Sixteenth.

ALANSON LOLA HALLSTEAD, B. S.,

Assistant in Dry Farming, Fort Hays Branch Agricultural Experiment Station (1910).

B. S., 1903.

Hays, Kan.

BRUCE STEINHOFF WILSON, B. S.,

Assistant in Coöperative Experiments (1910, 1912).

B. S., 1908.

Ag 60; 514 N. Manhattan.

ASHER EULESTA LANGWORTHY, Ph. C.,

Feeding-stuffs Inspector, Agricultural Experiment Station (1912).

Ph. C., University of Kansas, 1911.

Ag 26; 1709 Laramie.

ROBERT GETTY,⁸ B. S. A.,

Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station (1913).

B. S. A., University of Nebraska, 1913.

Hays, Kan.

FREDERICK ARTHUR KIENE,⁴ B. S.,

Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station (1912; Mch. 31, 1919).

B. S., 1906.

Hays, Kan.

WILLIAM PATRICK HAYES, M. S.,

Assistant in Entomology (1913, 1914).

B. S., 1913; M. S., 1918.

F 54A; 319 Denison.

MARION HARRISON,

Assistant in Clothing and Textiles (1914).

Graduate, Mechanics Institute, Rochester, N. Y., 1913.

L 65; 1314 Fremont.

FLORENCE HUNT,

Assistant in Clothing and Textiles (1914).

Graduate, Pratt Institute, 1910.

L 64; 1412 Leavenworth.

GRACE ADELLA PALMER,¹⁰

Assistant in Domestic Art (1914 - Dec. 9, 1918).

Graduate, Mechanics Institute, 1914.

4. Resigned.

8. In coöperation with the U. S. Department of Agriculture.

10. Deceased.

22. Absent on leave, Mch. 1 - July 1, 1919.

- OTIS EVERETT STRODTMAN,⁸ D. V. S.,
Deputy Inspector and College Representative, Marshall County Chol-
era Eradication Project (1914).
D. V. S., Kansas City Veterinary College, 1911. Marysville, Kan.
- LUCILE WARNOCK, A. B.,
Loan Assistant in Library (1914).
A. B., Monmouth College, 1913. F 31; 1419 Laramie.
- HUGH DURHAM, A. M.,
Assistant to the Dean of the Division of Agriculture (1915);
Assistant to the Director of the Agricultural Experiment Station
(1915, 1918).
Graduate, Kansas State Normal School, 1901; A. B., University of Kansas, 1909;
A. M., *ibid.*, 1915. Ag 30; 730 Osage.
- MABEL GERTRUDE BAXTER,
Class Reserves Assistant in Library (1916).
F 31; 1624 Fairchild.
- ARMIN MEREDITH DOERNER, B. S.,
B. S., Oregon Agricultural College, 1916. H 32; 1321 Poyntz.
- LESTER HENRY DRAYER,
Assistant in Heat and Power (1916).
E 3; 1201 Kearney.
- JOSEPH PRESTWICH SCOTT,²⁰ D. V. M.,
Assistant in Veterinary Medicine (1916, 1917).
B. S., Scientific Gymnasium, Lausanne, Switzerland, 1910; D. V. M., Ohio State
University, 1914. V 32; 343 N. Fifteenth.
- FRANK WILLIAMSON KIRK,⁴
Agent for Negro Farmers, Division of College Extension (1917–Mch.
1, 1919).
Graduate, Langston (Okla.) University, 1913.
- SIDNEY JACK PEARCE, B. S.,
Assistant Deputy State Dairy Commissioner (1917; July 1, 1918).
B. S., University of Nebraska, 1917. X; 1023 Anderson.
- LENA LETITIA PRICE,
Secretary to the President (1912; July 1, 1918).
A 30; 1642 Fairchild.
- JOY ELLA ANDREWS,⁴ A. B.,
Assistant in Zoölogy (1917–June 30, 1919).
A. B., University of Wisconsin, 1917.
- EDITH LORRAINE BOND, A. B.,
Assistant in Physical Training for Women (1917).
A. B., University of Wisconsin, 1917. N 3; 421 N. Sixteenth.
- ELIZABETH PERRY HARLING,
Seed Analyst (1912, 1917).
Ag 77; 628 Fremont.

4. Resigned.

8. In coöperation with the U. S. Department of Agriculture.

20. Absent on leave, in military service, Sept. 1, 1918, to Feb. 1, 1919.

- GRACE ROBERTA HESSE, A. B.,
Assistant in Modern Languages (1917).
A. B., University of Michigan, 1917. N 60; 1641 Fairchild.
- JANETTE ELIZA BELLE LONG,⁴
Specialist in Project Reports and Assistant in the Office of the Dean,
Division of College Extension (1917–May 1, 1919).
- HARRIET WRIGHT ALLARD,
Assistant in Home Economics, Extension Schools, Division of College
Extension (1917). A 36; 510 N. Ninth.
- HENRY JAMES ALLEN,
Assistant in Heat and Power (1914, 1917). E 27; 330 Vattier.
- WO RAY DAVIS,⁴ B. S.,
Assistant in Dairy Husbandry (Nov. 1, 1917–May 1, 1919).
B. S., Iowa State College, 1917.
- GEORGE HERBERT PHINNEY,
Assistant in Agronomy (1917); Foreman of Agronomy Farm (1917).
Graduate, Topeka Business College, 1903. Agronomy Farm.
- CHESTER WILLIS OAKES,
Miller, Department of Milling Industry (1918). Ag 26B; 804 Moro.
- HAROLD ARTHUR PRATT, B. S.,
Assistant in Horticulture (1918); Foreman of Greenhouses (1918).
B. S., Massachusetts Agricultural College, 1917. College Greenhouses.
- CLENNIE ELSIE BAILEY,⁴ A. B.,
Assistant in Zoölogy (Mch. 9–Sept. 30, 1918); Assistant in Genetics,
Agricultural Experiment Station (Mch. 9–Sept. 30, 1918).
A. B., Indiana State Normal School, 1917.
- LOUIS THEODORE ANDEREGG,⁴ A. M., M. S.,
Assistant in Agricultural Analysis, Agricultural Experiment Station
(1918–Mch. 31, 1919).
A. B., Oberlin College, 1911; A. M., *ibid.*, 1913; M. S., University of Michigan, 1915.
- JOHN ANDERSON,⁴
State Feeding-stuffs Inspector, Agricultural Experiment Station (Apr.
1–May 16, 1918).
- CYRUS EARL BUCHANNAN,
Assistant in Feed Control (1912; Apr. 24, 1918). Ag 26A; 911 Vattier.
- BEATTY HOPE FLEENOR,
Assistant to Director of Rural Service, Division of College Extension
(July 1, 1918). A 3; 1309 Poyntz.

4. Resigned.

NORA HOSACK,⁴

Assistant in Blackleg Vaccine Production Laboratory (July 1–Nov. 1, 1918).

MABLE CALDWELL, B. S.,

Assistant to Superintendent of Institutes and Extension Schools, Division of College Extension (Aug. 1, 1918).

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1918.
A 34; 1408 Fairchild.

CORA ALBERTA PITMAN, B. S.,

Assistant to the Registrar (Aug. 15, 1918).

B. S. in H. E., 1916. A 29; 730 Yuma.

WILLIAM FRANCIS PICKETT, B. S.,

Assistant in Horticulture (1917; Sept. 1, 1918).

B. S., 1917. R. R. 8.

FLOYD W. ATKESON, B. S.,

Assistant in Dairy Husbandry (Sept. 1, 1918).

B. S. in Agr., University of Missouri, 1918. D 30; 1623 Anderson.

RAMA VIRGINIA BENNETT,⁴ B. S.,

Assistant in Domestic Science (Sept. 1–Dec. 30, 1918).

B. S., Columbia University, 1918.

HELEN SCUREMAN CLARK,⁴ B. S.,

Assistant in Domestic Science (Sept. 1, 1918–June 30, 1919).

B. S., Cornell University, 1917.

EDITH GENEVIEVE FINDLEY, B. S.,

General Assistant in Library (Sept. 1, 1918).

B. S. in H. E., 1918. F 6; 1130 Vattier.

CLAYTON BRONAUGH GRIFFITHS, D. V. M.,

Assistant in Veterinary Medicine (Sept. 1, 1918).

D. V. M., 1918. V 2A; 340 N. Sixteenth.

RUTH EVALYN HURD, B. S.,

Assistant in Zoölogy (Sept. 1, 1918).

B. S., Carthage College, 1918. F 55; 317 N. Seventeenth.

VERA ANNE MCCOY,²⁴ B. S.,

Assistant in Household Economics (Sept. 1, 1918).

B. S., 1917. L 28; 1301 Poyntz.

BRUCE BUNYAN SMITH,

Assistant in Farm Engineering (Sept. 1, 1918):

R 26; 830 Laramie.

EDNA WHITE, A. B.,

Assistant Reference Librarian (Sept. 1, 1918).

A. B., Knox College, 1910. F 32; 1623 Fairchild.

LYMAN RAY VAWTER, D. V. M.,

Assistant in Veterinary Pathology (Sept. 9, 1918).

D. V. M., 1918. V 56; 931 Osage.

4. Resigned.

24. Absent on leave, Apr. 8 to June 30, 1919.

- NATHAN DANIEL HARWOOD, D. V. M.,
Assistant in Serum Plant (Sept. 9, 1918; Feb. 1, 1919); Assistant in
Pathology and Anatomy (Sept. 9, 1918 – Jan. 31, 1919).
D. V. M., 1918. V 32; 340 N. Sixteenth.
- GEORGE CALVIN GIBBONS, B. S.,
Assistant to Superintendent, Fort Hays Branch Experiment Station,
(July 1, 1918; Sept. 15, 1918).
B. S. in Agr., 1918. Hays, Kan.
- MARTHA LIVINGSTON DENNY, A. B.,
Assistant in Zoölogy (Oct. 1, 1918); Assistant in Genetics, Agricul-
tural Experiment Station (Oct. 1, 1918).
A. B., Indiana University, 1917. Insectary; 1430 Poyntz.
- FLOYD ALONZO SMUTZ,⁶ B. S.,
Assistant in Architecture and Drawing (Oct. 1, 1918 – June 30, 1919).
B. S. in Arch., 1914. A 55; 912 Fremont.
- MARGARET ELEANOR MOORE, B. S.,
Assistant in Blackleg Vaccine Production (Nov. 1, 1918).
B. S., 1914. V 24; 1214 Bluemont.
- MORRILL THORNTON DOW, B. S.,
Assistant in Physics (Dec. 30, 1918).
B. S., Ottawa University, 1917. C 39; 1100 Moro.
- HARRY WORKMAN AIMAN,⁶
Assistant in Shop Practice (Oct. 1, 1918; Jan. 1, 1919).
S 26; 728 Poyntz.
- FRANK MARION AIMAN,
State Feeding-stuffs Inspector (Jan. 1, 1919).
Ag 26B; 528 Laramie.
- EDDIE GRANELL,
Assistant in Shop Practice (Jan. 1, 1919).
S 38; 530 Fremont.
- JOSEPH NATHANIEL LUDEN,⁶
Assistant in Farm Engineering (Jan. 1, 1919).
R 50; 1213 Vattier.
- HUBERT ALOYSIUS McNAMEE,⁶
Assistant in Farm Engineering (Jan. 1 – Mch. 1, 1919).
Graduate, Air Service Mechanics School, 1918.
- SAMUEL JAMES MOLBY,⁶
Assistant in Farm Engineering (Jan. 1 – Mch. 1, 1919).
B. S., 1917; B. S. in Agr., 1918.
- WILLIAM CLYDE WHIPPO,
Assistant in Shop Practice (Jan. 7, 1919).
S 32; 1214 Vattier.

6. Temporary appointment.

- JOHN ROBINSON McCLUNG,⁶ A. M.,
 Assistant in Bacteriology (Feb. 10 – June 30, 1919).
 B. S., 1910; A. M., University of the South, 1913. V 53; 823 Laramie.
- MARGARET ROBINSON,⁶ B. S.,
 Assistant in Bacteriology (Feb. 10 – June 30, 1919).
 B. S., 1918. V 53; 918 Bluemont.
- ALVA GORBY,
 Assistant in Clothing and Textiles (Feb. 11, 1919).
 Diploma, Stout Institute, 1915. L 65; 1725 Fairchild.
- CLARENCE ROY JACCARD, B. S.,
 Nurseryman, Fort Hays Branch Agricultural Station (Mch. 25, 1919).
 B. S. in Agr., 1914. Hays, Kan.
- SELMA MARIE FOBERG,
 Office Assistant to the Dean, Division of College Extension (Apr. 1, 1919).
- GEORGE VANDERVEEN, B. S.,
 Assistant Chemist, Agricultural Experiment Station (Apr. 3, 1919).
 B. S., University of Chicago, 1917. C 3; 1623 Anderson.
- ELIZABETH HARGRAVES BALDWIN,⁶
 Assistant in Domestic Science (Apr. 9 – June 30, 1919).
- RUTH EUGENIA SANKEE, A. B.,
 Reference Assistant in Library (Sept. 1, 1919).
 A. B., University of Kansas, 1914.

SUPERINTENDENTS

- JACOB LUND, M. S.,
 Superintendent of Heat and Power (1893, 1901); Custodian of Buildings and Grounds (1893, 1917).
 B. S., 1883; M. S., 1886. E 26B; 1414 Fairchild.
- CHARLES ROZELL WEEKS, B. S.,
 Superintendent, Fort Hays Branch Agricultural Experiment Station (1916).
 B. S., University of Nebraska, 1907; B. Ed., Nebraska State Normal School, Peru, Neb., 1912. Hays, Kan.
- GEORGE SELICK KNAPP, B. S.,
 Superintendent, Garden City Branch Agricultural Experiment Station (1915, 1916).
 B. S., 1914. Garden City, Kan.
- JOHN JASPER BAYLES, B. S.,
 Superintendent, Colby Branch Agricultural Experiment Station (Apr. 22, 1918).
 B. S., 1915. Colby, Kan.

6. Temporary appointment.

CARL IVAR MATTSO, N,
Superintendent, Tribune Branch Agricultural Experiment Station
(July 15, 1918).

Tribune, Kan.

HAROLD BAYLISS MUGGLESTONE,
Superintendent of Poultry Farm (Aug. 15, 1918).

North of Campus.

AGRICULTURAL AGENTS*

PLEASANT ELIJAH CRABTREE,⁴
District Demonstration Agent, Western Kansas, Division of College
Extension (1908, 1916—Apr. 15, 1919).

WILLIAM ARMFIELD BOYS, B. S.,
Sumner County Agricultural Agent, Division of College Extension
(1912; Aug. 1, 1918).

B. S., 1904.

Wellington, Kan.

EVEREST JOHN MACY, B. S.,
Sedgwick County Agricultural Agent, Division of College Extension
(1913; June 15, 1918).

B. S., Earlham College, 1904.

Wichita, Kan.

OTTO C. HAGANS, B. S.,
Atchison County Agricultural Agent, Division of College Extension
(1914; Mch. 7, 1918).

B. S., 1914.

Effingham, Kan.

HUBERT LOWELL POPENOE,⁴ B. S.,
Marshall County Agricultural Agent, Division of College Extension
(1914; Jan. 1, 1919).

B. S., 1914.

VALENTINE MEACHAM EMMERT, B. S.,
McPherson County Agricultural Agent, Division of College Extension
(1916).

B. S., 1901.

McPherson, Kan.

RAYMOND OLIVER SMITH, B. S.,
Wilson County Agricultural Agent, Division of College Extension
(1916).

B. S. in Agr., University of Nebraska, 1915.

Fredonia, Kan.

RALPH POWELL SCHNACKE, B. S.,
Pawnee County Agricultural Agent, Division of College Extension
(1916).

B. S. in Agr., 1916.

Larned, Kan.

IRA NICHOLS CHAPMAN, B. S.,
Leavenworth County Agricultural Agent, Division of College Extension
(1916).

B. S., 1916.

Leavenworth, Kan.

* All agricultural agents are employed coöperatively by the College and the U. S. Department of Agriculture, and in case of county agents in coöperation with the county farm bureaus.

4. Resigned.

- PRESTON ORIN HALE, B. S.,
Chase County Agricultural Agent, Division of College Extension
(1917).
B. S., 1916. Cottonwood Falls, Kan.
- RAYMOND WALTER SCHAFER, M. S.,
Washington County Agricultural Agent, Division of College Extension (1917).
B. S., 1914; M. S., University of Wisconsin, 1917. Washington, Kan.
- ALFRED LESTER CLAPP, B. S.,
Morris County Agricultural Agent, Division of College Extension
(1917).
B. S., 1914. Council Grove, Kan.
- FLOYD JOE ROBBINS, B. S.,
Franklin County Agricultural Agent, Division of College Extension
(1917).
B. S., 1913. Ottawa, Kan.
- ARCHIE GLENN VAN HORN,⁴ B. S.,
Wyandotte County Agricultural Agent, Division of College Extension
(1917 - Mch. 31, 1919).
B. S., 1916.
- RALPH SAMS HAWKINS, B. S.,
Nemaha County Agricultural Agent, Division of College Extension
(1918).
B. S., 1914. Seneca, Kan.
- ORVILLE BROWN BURTIS, B. S.,
Clay County Agricultural Agent, Division of College Extension
(1918).
B. S., 1916. Clay Center, Kan.
- WILHELM ALEXANDER WUNSCH, B. S.,
Harvey County Agricultural Agent, Division of College Extension
(1917, 1918).
B. S., 1917. Newton, Kan.
- WILBUR WILLIAM WRIGHT, B. S.,
Greenwood County Agricultural Agent, Division of College Extension
(1917; Mch. 15, 1918).
B. S., 1917. Eureka, Kan.
- CLARENCE W. VETTER,²¹ B. S.,
Jackson County Agricultural Agent, Division of College Extension
(Mch. 25, - July 17, 1918).
B. S. in Agr., Iowa State College, 1917.
- HERMAN FREDERICK TAGGE,⁴ B. S.,
Doniphan County Agricultural Agent, Division of College Extension
(Jan. 1, 1918; Apr. 16, 1918 - Apr. 1, 1919).
B. S., 1914.

4. Resigned.

21. Resigned to enter military service.

- THOMAS EDWIN MOORE,²¹ B. S.,
Douglas County Agricultural Agent, Division of College Extension
(May 1 – June 18, 1918).
B. S. in Agr., 1916.
- CHARLES D. THOMPSON, B. S. D.,
Neosho County Agricultural Agent, Division of College Extension
(May 24, 1918).
B. S. D., Warrensburg (Mo.) State Normal School, 1895. Erie, Kan.
- ALBERT CECIL HANCOCK, B. S.,
Cheyenne County Agricultural Agent, Division of College Extension
(June 15 – July 15, 1918) and (Feb. 17, 1919).
B. S. in Agr., 1918. St. Francis, Kan.
- EDWIN ISAAC MARIS, B. S.,
Rawlins County Agricultural Agent, Division of College Extension
(Jan. 1, 1918; July 1, 1918).
B. S., 1916. Atwood, Kan.
- EARL JOSEPH WILLIS, B. S.,
Cherokee County Agricultural Agent, Division of College Extension.
(Jan. 7, 1918; July 1, 1918).
B. S. in Agr., 1914. Columbus, Kan.
- JOHN W. THORNBURGH, C. E.,
Hodgeman County Agricultural Agent, Division of College Extension
(July 5, 1918).
C. E., Campbell College, 1888. Jetmore, Kan.
- FREDERICK THOMAS REES,⁴ B. S.,
Douglas County Agricultural Agent, Division of College Extension
(Jan. 1, 1918; July 10, 1918 – Feb. 28, 1919).
B. S., 1918.
- AVERY CLEVELAND MALONEY, B. S.,
Bourbon County Agricultural Agent, Division of College Extension
(July 10, 1918).
B. S., 1918. Fort Scott, Kan.
- CARL LEWIS HOWARD,
Meade County Agricultural Agent, Division of College Extension
(July 15, 1918).
Meade, Kan.
- EDWARD H. LEKER, B. S. A.,
Jackson County Agricultural Agent, Division of College Extension
(Aug. 12, 1918).
B. S. A., University of Missouri, 1917. Holton, Kan.
- ROBERT LEWIS BARNUM, B. S.,
Marshall County Agricultural Agent, Division of College Extension
(Aug. 20, 1918).
B. S., 1918. Marysville, Kan.

4. Resigned.

21. Resigned to enter military service.

- WARD STANLEY GATES,⁴ B. S.,
Barton County Agricultural Agent, Division of College Extension
(Sept. 9, 1918 - Mar. 1, 1919).
B. S., 1914.
- LE ROY ALT,⁴ B. S.,
Miami County Agricultural Agent, Division of College Extension
(Sept. 16, 1918 - Mar. 1, 1919).
B. S., 1914.
- HERBERT LYNNE HILDWEIN, B. S.,
Kingman County Agricultural Agent, Division of College Extension
(1917; Oct. 5, 1918).
B. S., 1914. Kingman, Kan.
- HAYS MARION COE,
Montgomery County Agricultural Agent, Division of College Extension
(Dec. 1, 1918).
Independence, Kan.
- FRANK SUMNER TURNER, B. S.,
Anderson County Agricultural Agent, Division of College Extension
(Dec. 23, 1918).
B. S., 1917. Garnett, Kan.
- JOE MYRON GOODWIN,
Jefferson County Agricultural Agent, Division of College Extension
(Jan. 1, 1919).
Valley Falls, Kan.
- LOUIS EDWARD HOWARD, B. S.,
Pratt County Agricultural Agent, Division of College Extension (Jan.
1, 1919).
B. S., 1917. Pratt, Kan.
- JACOB MICHAEL MURRAY, D. V. M.,
Nemaha County Agricultural Agent, Division of College Extension
(Jan. 1, 1919).
D. V. M., 1908. Seneca, Kan.
- GEORGE W. SALISBURY, B. S.,
Labette County Agricultural Agent, Division of College Extension
(Feb. 1, 1919).
B. S., University of Illinois, 1915. Altamont, Kan.
- FRANK OTTO BLECHA, B. S.,
Shawnee County Agricultural Agent, Division of College Extension
(Feb. 11, 1919).
B. S. in Agr., 1918. Topeka, Kan.
- WILL RAY BOLEN, B. S.,
District Agricultural Agent, Saline, Ottawa, and Dickinson Counties,
Division of College Extension (Feb. 16, 1919).
B. S. in Agr., 1916. Solomon, Kan.
- GAYLORD HANCOCK,
Lyon County Agricultural Agent, Division of College Extension (Mch.
1, 1919).
Emporia, Kan.

4. Resigned.

- THOMAS E. CLARKE, B. S.,
Barber County Agricultural Agent, Division of College Extension
(Mch. 5, 1919).
B. S. in Agr., 1910. Medicine Lodge, Kan.
- JOSEPH V. QUIGLEY, B. S.,
Miami County Agricultural Agent, Division of College Extension
(Mar. 15, 1919).
B. S., in Agronomy, 1916. Paola, Kan.
- THEODORE W. THORDARSON, B. S.,
Barton County Agricultural Agent, Division of College Extension
(Mch. 15, 1919).
B. S., North Dakota Agricultural College, 1916. Great Bend, Kan.
- AMWEL EDWIN JONES, B. S.,
Jewell County Agricultural Agent, Division of College Extension
(May 1, 1919); Emergency Demonstration Agent, Jewell County
(Feb. 1 – Apr. 30, 1919).
B. S., 1915. Mankato, Kan.
- FRANK HAROLD DILLENBECK, B. S.,
Doniphan County Agricultural Agent (Apr. 1, 1919).
B. S., 1916. Troy, Kan.
- ERNEST HENRY PTACEK, B. S.,
Douglas County Agricultural Agent (Apr. 1, 1919).
B. S. in A. H., 1918. Lawrence, Kan.
- JOHN LAWRENCE GARLOUGH,⁶ B. S.,
Marion County Agricultural Agent (May 5 – June 30, 1919).
B. S., 1916. Marion, Kan.
- ORVILLE THOMAS BONNETT,²¹ B. S.,
Assistant Washington County Agricultural Agent, Division of College
Extension (June 1 – June 15, 1918).
B. S. in Agr., 1918. Washington, Kan.

EMERGENCY DEMONSTRATION AGENTS⁸

- JAMES HENDRIX ADAMS, B. S.,
Emergency Demonstration Agent, Elk and Chautauqua Counties (June
1916; Jan. 1, 1919).
B. S., 1916. Moline, Kan.
- HENRY JOSEPH ADAMS, B. S.,
Emergency Demonstration Agent, Gray County (Aug. 15, 1917; June
27, 1918).
B. S., 1917. Cimarron, Kan.
- CHARLES ELMER CASSEL, B. S.,
Emergency Demonstration Agent, Finney County (1912; Aug. 16,
1917).
B. S., 1910. Garden City, Kan.

6. Temporary appointment.

8. In coöperation with the U. S. Department of Agriculture.

21. Resigned to enter military service.

- LUTHER EARL WILLOUGHBY, B. S.,
Emergency Demonstration Agent, West Central Kansas (1917; Jan. 25, 1919).
B. S., 1912; B. S. in Agr., 1916. Hays, Kan.
- JOHN VERN HEPLER, B. S.,
Emergency Demonstration Agent, Ford County (1917).
B. S., 1915. Dodge City, Kan.
- BLAINE CROW,⁴ B. S.,
Emergency Demonstration Agent, Pottawatomie and Wabaunsee Counties (1917).
B. S., 1917.
- JOHN MARTIN KESSLER, B. S.,
Emergency Demonstration Agent, at Large (1917).
B. S., 1899. Manhattan, Kan.
- HARRY SCOTT WILSON,
Emergency Demonstration Agent, Johnson County (1917; Nov. 7, 1918).
Olathe, Kan.
- JOHN ALFRED SCHEEL, B. S.,
Emergency Demonstration Agent, Osage and Coffey Counties (1917).
B. S., 1894. Melvern, Kan.
- THOMAS WALTER ALLISON,⁴ B. S.,
Emergency Demonstration Agent, Elk and Chautauqua Counties (1917 - Dec. 31, 1918).
B. S., 1898.
- DAVID H. GRIPTON,¹⁰ B. S.,
Emergency Demonstration Agent, Osborne and Mitchell Counties (1917 - Nov. 19, 1918).
B. S., 1906.
- FRANK ANDREW DAWLEY, B. S.,
Emergency Demonstration Agent, at Large (1917).
B. S., 1895. Manhattan, Kan.
- EDWARD LARSON, B. S.,
Emergency Demonstration Agent, Pratt County (1917).
B. S., 1911. Pratt, Kan.
- CHARLES ANDERSON SCOTT, B. S.,
Emergency Demonstration Agent, at Large (1917).
B. S., 1901. Manhattan, Kan.
- GEORGE W. SIDWELL,
Emergency Demonstration Agent, Greeley County (1918).
Leoti, Kan.
- PRICE HARLAN WHEELER,⁴ B. S.,
Emergency Demonstration Agent, Kearny and Hamilton Counties (1918 - Mch. 31, 1919).
B. S., 1916.

4. Resigned.

10. Deceased.

RALPH BERTRAM MEDLIN,
Emergency Demonstration Agent, Thomas, Logan, Wallace, and Sherman Counties (Mch. 16, 1918).

Winona, Kan.

EUGENE F. TINKER, Ph. D.,
Emergency Demonstration Agent, Rooks and Graham Counties (Apr. 10, 1918).

B. Ped., Kansas Wesleyan University, 1912; Ph. B., *ibid.*, 1913. Damar, Kan.

HARLEY TOWNSEND CORSON,⁴
Emergency Demonstration Agent, Allen and Woodson Counties (May 20, 1918 – May 15, 1919).

ALBERT BARNEY KIMBALL, B. S.,
Emergency Demonstration Agent, Clark County (Aug. 20, 1918).
B. S., 1889. Ashland, Kan.

CHARLES WESLEY SHULL,⁴ B. S.,
Emergency Demonstration Agent, Seward County (Aug. 20, 1918 – Dec. 21, 1918).

B. S., 1913. Liberal, Kan.

CHARLES LEONARD ZOLLER,
Emergency Demonstration Agent, Norton and Decatur Counties (Aug. 20, 1918).

B. S., 1910. Oberlin, Kan.

A. W. BRUMBAUGH,
Emergency Demonstration Agent, Lincoln County (Sept. 1 – Nov. 1, 1918).

Vesper, Kan.

G. H. KINKEL,
Emergency Demonstration Agent, Sheridan County (Sept. 1 – Nov. 1, 1918).

Hoxie, Kan.

CHARLES LA GASSE,
Emergency Demonstration Agent, Cloud and Republic Counties (Sept. 1 – Oct. 31, 1918).

Rice, Kan.

EMERGENCY HOME DEMONSTRATION AGENTS⁸

MARION PERCIVAL BROUGHTEN, A. B., B. S.,
Kansas City (Kan.) Emergency Home Demonstration Agent, Division of College Extension (1914, 1917).

A. B., Leland Stanford University, 1900; B. S., 1914. Kansas City, Kan.

ELSIE LORETTA BAIRD, B. S.,
Anderson County Home Demonstration Agent, Division of College Extension (1917).

B. S., 1915. Garnett, Kan.

MOLLIE LINDSEY,
Ness County Emergency Home Demonstration Agent, Division of College Extension (1917).

Ness City, Kan.

4. Resigned.

8. In coöperation with the U. S. Department of Agriculture.

- ELLEN EUSTINA NELSON, B. S.,
Seward County Emergency Home Demonstration Agent, Division of
College Extension (1917).
B. S., 1911. Liberal, Kan.
- MAUDE MILDRED COE, B. S.,
McPherson County Emergency Home Demonstration Agent, Division
of College Extension (1917).
B. S., 1902. McPherson, Kan.
- EDNA MAY DANNER, B. S.,
Marshall County Emergency Home Demonstration Agent, Division of
College Extension (1917).
B. S., 1914. Marysville, Kan.
- AVIS TALCOTT, A. B.,
Atchison County Emergency Home Demonstration Agent, Division of
College Extension (1917).
A. B., Rockford College, 1906. Effingham, Kan.
- RUTH ELLEN WOOSTER, A. B.,
Lyon County Emergency Home Demonstration Agent, Division of Col-
lege Extension (1917).
A. B., Kansas State Normal School, 1913. Emporia, Kan.
- MARJORIE RUSSELL KIMBALL,
Manhattan and Riley County Emergency Home Demonstration Agent,
Division of College Extension (1918).
Graduate, Mechanic's Institute, 1906. Manhattan, Kan.
- ISA ALLENE GREENE,⁴ B. S.,
Fort Scott Emergency Home Demonstration Agent, Division of Col-
lege Extension (Feb. 1 – Nov. 6, 1918).
- MARTHA MAE MCLEOD,⁴ B. S.,
Hutchinson Emergency Home Demonstration Agent, Division of Col-
lege Extension (1918 – Feb. 1, 1919).
- IRIS LIVINGSTON,⁴ A. B.,
Wichita Emergency Home Demonstration Agent, Division of College
Extension (Feb. 1, 1918 – Mch. 22, 1919).
A. B., Iowa State Teachers' College, 1917.
- FLORINE FATE,⁴ B. S.,
Chase County Emergency Home Demonstration Agent, Division of Col-
lege Extension (Feb. 9 – Nov. 1, 1918).
B. S., 1911.
- ANNA ALLEN,⁴ B. S.,
Independence Emergency Home Demonstration Agent, Division of Col-
lege Extension (Feb. 20, 1918 – Feb. 1, 1919).
B. S., Kansas Manual Training Normal School, 1916.

4. Resigned.

- ETHEL MARCHBANKS, B. S.,
Pittsburg Emergency Home Demonstration Agent, Division of College
Extension (Mch. 20, 1918).
B. S., Kansas Manual Training Normal School, 1915. Pittsburg, Kan.
- ELIZABETH ROTHWEILER HARDY,⁴ B. S.,
Clay County Emergency Home Demonstration Agent, Division of Col-
lege Extension (May 20 - Dec. 21, 1918).
B. S., Kansas Manual Training Normal School, 1915.
- LETTY HAM BAKER,⁴
Stevens County Emergency Home Demonstration Agent, Division of
College Extension (July 1, 1918 - Feb. 4, 1919).
- MAUDE ESTES,⁴ B. S.,
Wyandotte County Emergency Home Demonstration Agent, Division
of College Extension (July 5, 1918 - Feb. 15, 1919).
B. S., 1910.
- HELEN MUNGER ANDERSON,⁴ B. S.,
Washington County Emergency Home Demonstration Agent, Division
of College Extension (Aug. 1, 1918 - Mch. 31, 1919).
B. S., 1915.
- EDITH ANTONETTE HOLMBERG, B. S.,
Morris County Emergency Home Demonstration Agent, Division of
College Extension (Aug. 1, 1918).
B. S., 1908. Council Grove, Kan.
- IRENE ALMA TAYLOR, B. S.,
Shawnee County Emergency Home Demonstration Agent, Division of
College Extension (Aug. 1, 1918).
B. S., 1908. Topeka, Kan.
- OLIVIA ESTHER PEUGH, B. S.,
Nemaha County Emergency Home Demonstration Agent, Division of
College Extension (Oct. 15, 1918).
B. S., 1916. Seneca, Kan.
- CARRIE P. KITTELL, B. S.,
Fort Scott Emergency Home Demonstration Agent, Division of Col-
lege Extension (Nov. 1, 1918).
B. S., Kansas State Normal School, 1915. Fort Scott, Kan.
- SARA JANE PATTON, B. S.,
Cherokee County Emergency Home Demonstration Agent, Division of
College Extension (Nov. 15, 1918).
B. S., 1915. Columbus, Kan.
- EFFIE MAY CARP,⁴ B. S.,
Chase County Emergency Home Demonstration Agent, Division of
College Extension (Jan. 1, 1919 - Mch. 8, 1919).
B. S., 1915.

4. Resigned.

SUE VANETTA HEMPHILL,

Clay County Emergency Home Demonstration Agent, Division of College Extension (Feb. 1, 1919).

Clay Center, Kan.

LUTIE V. BURKHOLDER,

Wichita Emergency Home Demonstration Agent, Division of College Extension (Apr. 1, 1919).

Graduate, Kansas State Manual Training Normal School, 1907. Wichita, Kan.

VERA ELIZABETH GOFFE,

Meade County Emergency Home Demonstration Agent, Division of College Extension (Apr. 15, 1919).

Meade, Kan.

COUNTY LEADERS IN BOYS' AND GIRLS' CLUB WORK

ELIZABETH SPENCER,

Temporary Woodson County Club Leader, Division of College Extension (1917).

Graduate, Kansas State Normal School, 1894.

Yates Center, Kan.

CHARLES A. BOYLE,⁶

Temporary Lyon County Club Leader, Division of College Extension (1917 - Dec. 31, 1918; Apr. 10 - June 30, 1919).

Emporia, Kan.

HUGH PAYSON ALEXANDER, A. B.,

Temporary Leavenworth County Club Leader, Division of College Extension (1918).

A. B., Park College, 1897.

Kipp, Kan.

JESSIE STEVENS McCAFFERTY,

Temporary Jefferson County Club Leader, Division of College Extension (1918).

Oskaloosa, Kan.

AVA LUCILE SELLS,⁴

Temporary Wabaunsee County Club Leader, Division of College Extension, Jan 1. - Nov. 30, 1918).

MABEL BROBERG TOWNLEY,⁴ B. S.,

Temporary Rice County Club Leader, Division of College Extension Jan. 1 - Dec. 31, 1918).

B. S., 1912.

CHARLES L. GASTENEAU,⁴ B. S.,

Temporary Labette County Director of Garden Clubs, Division of College Extension (Apr. 1 - Nov. 30, 1918).

B. S., Kansas Manual Training Normal School, 1917.

LOLA BELLE THOMPSON,⁴ A. B.,

Temporary Rice County Club Leader, Division of College Extension (Mch. 1 - Dec. 31, 1918).

A. B., College of Emporia, 1916.

4. Resigned.

6. Temporary appointment.

EULALIA GRIFFITH NEVINS,⁴

Temporary Ford County Club Leader, Division of College Extension
(Mch. 11 – July 1, 1918).

KATHRYN BIDEAU,⁴

Temporary Woodson County Club Leader, Division of College Extension
(Apr. 1 – Aug. 15, 1918).

EDWIN CLINTON MELLICK,⁴ A. B.,

Temporary Thomas County Club Leader, Division of College Extension
(Apr. 1 – June 30, 1918).

A. B., Lake Forrest College, 1913.

JESSIE GERTRUDE ADEE,

Ottawa County Club Leader, Division of College Extension (May 1,
1918).

Delphos, Kan.

GRACE LADORA HONNELL,⁴ A. B.,

Temporary Assistant Wyandotte County Club Leader, Division of College Extension
(May 1 – Sept. 1, 1918).

A. B., Baker University, 1915.

ROY EDWIN FREY,

Emergency Dickinson County Club Leader, Division of College Extension
(May 2, 1918).

Graduate, Fort Hays State Normal School, 1917.

Chapman, Kan.

MADGE T. HAWKINS,⁴ B. S.,

Temporary Republic County Club Leader, Division of College Extension
(May 16 – Sept. 14, 1918).

B. S., 1917.

Belleville, Kan.

GEORGE RAYMOND NEW,⁴ B. S.,

Temporary Assistant Lyon County Club Leader, Division of College Extension
(May 16 – Sept. 1, 1918).

B. S., 1917.

Emporia, Kan.

WINIFRED LEWIS,⁴ A. B.,

Temporary Neosho County Club Leader, Division of College Extension
(May 27 – Oct. 1, 1918).

A. B., Kansas State Normal School, 1913.

Chanute, Kan.

FLORENCE SNELL, B. S.,

Temporary Leavenworth County Club Leader, Division of College Extension
(June 21, 1918).

B. S., 1911.

Leavenworth, Kan.

JESSIE BANGS CAUTHORN,

Temporary Jewell County Club Leader, Division of College Extension
(Feb. 1 – Dec. 31, 1918) and (Feb. 1, 1919).

Mankato, Kan.

⁴. Resigned.

FLORENCE WHIPPLE, B. S.,

Temporary Brown County Club Leader, Division of College Extension
(Mar. 15, 1919).

B. S. in H. E., 1912.

Hiawatha, Kan.

HARRY CHARLES BAIRD,⁴ B. S.,

Temporary Chase County Club Leader, Division of College Extension
(May 1 – June 30, 1919).

B. S., 1914.

Cottonwood Falls, Kan.

MILITARY INSTRUCTORS, STUDENTS' ARMY TRAINING CORPS

GEORGE STURGES, Capt. Inf., U. S. A.,

Commanding Officer (May 12, 1918 – Jan. 17, 1919).

B. A., Yale University, 1906.

WILLIAM B. PETERS, Capt. M. C., U. S. A.,

Surgeon (May 15, 1918 – Dec. 27, 1918).

M. D., Central University of Kentucky, 1907.

FRANK M. O'KELLEY, Capt. M. C., U. S. A.,

Assistant Surgeon (Aug. 31, 1918 – Nov. 14, 1918).

M. D., St. Louis College of Physicians and Surgeons, 1889.

RALPH LEO KEMPER, Capt. Inf., U. S. A.,

Company Commander, Company 1 (May 13, 1918 – Dec. 27, 1918).

A. B., Ohio State University, 1917.

REUBEN W. BLOMBERG, First Lieut. D. C., U. S. A.,

Dental Surgeon (June 17, 1918 – Dec. 30, 1918).

D. D. S., State University of Iowa, 1916.

IRVING M. REDIKER, First Lieut. Inf., U. S. A.,

Company Commander, Company 3 (Sept. 25, 1918 – Dec. 24, 1918).

WILLIAM E. CODY, First Lieut. M. C., U. S. A.,

Assistant Surgeon (Oct. 11, 1918 – Dec. 30, 1918).

M. D., State University of Iowa, 1911.

STONEWALL JACKSON SMITH, Second Lieut. Inf., U. S. A.,

Instructor (May 14, 1918 – Sept. 21, 1918).

ORRIS RAY JONES, Second Lieut. Inf., U. S. A.,

Instructor (May 20, 1918 – Sept. 11, 1918).

JESSE ROSENBAUM, Second Lieut. Q. M. C., U. S. A.,

Quartermaster (July 7, 1918 – Jan. 2, 1919).

GEORGE MORRIS BELTZHOOVER, JR., Second Lieut. Inf., U. S. A.,

Company Commander, Company 2 (July 10, 1918 – Dec. 24, 1918).

A. B., University of West Virginia, 1899; LL. B., *ibid.*, 1901.

BERTHAL VINCENT, Second Lieut. Inf., U. S. A.,

Company Commander, Company 4 (July 10, 1918 – Dec. 24, 1918).

Graduate, Western Kentucky State Normal School, 1918.

4. Resigned.

- JOHN TAYLOR COCHRANE, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 20, 1918 – Dec. 24, 1918).
- JAY JOHN JAKOWSKY, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 20, 1918 – Dec. 24, 1918).
- MERL C. CLIFT, Second Lieut. Inf., U. S. A.,
Company Commander, Company 5 (Sept. 23, 1918 – Dec. 24, 1918).
- HOWARD D. H. BROWN, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- HARRY H. CLEAVELAND, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- TALBOT F. CLINGMAN, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- CLAUDE V. COCHRAN, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- ERNEST M. COLE, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- GEORGE W. McCLURE, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- JOHN EARL SMITH, Second Lieut. Inf., U. S. A.,
Adjutant and Personal Adjutant (Sept. 26, 1918 – Dec. 31, 1918).
A. B., Indiana University, 1912; A. M., University of Wisconsin, 1915.
- EDWIN M. TAYLOR, Second Lieut. Inf., U. S. A.,
Instructor (Sept. 26, 1918 – Dec. 24, 1918).
- SYLVESTER JOY COE, Second Lieut. Inf., U. S. A.,
Instructor (Oct. 12, 1918 – Dec. 24, 1918).
- FRANCIS E. BROLLIAR, Second Lieut. Inf., U. S. A.,
Instructor (Oct. 14, 1918 – Dec. 24, 1918).

FELLOWS

- HELEN MITCHELL, B. S.,
Fellow in Chemistry (Sept. 1, 1918).
B. S., 1918. C 64; 1622 Leavenworth.
- ESTHER BOELL SMITH, B. S.,
Fellow in Chemistry (Sept. 1, 1918).
B. S., 1914. C 64; 730 Fremont.
- WILLIAM PRESTON TUTTLE, B. S. A.,
Fellow in Soils (1917; Feb. 1, 1919).
B. S. A., University of Kentucky, 1915. Ag 55; 1623 Anderson.

OTHER OFFICERS

JAMES THOMAS LARDNER,
Assistant to Business Manager of Board of Administration (1913,
1917).

Topeka, Kan.

JESSIE McDOWELL MACHIR,
Registrar (1913).

A 29; 1641 Fairchild.

GEORGE RICHARD PAULING,
Engineer of Power Plant (1913); Superintendent of Building and Re-
pair (1916).

E 26A; 1017 Fremont.

STEPHEN ARNOLD GEAUQUE,
Head Janitor (1918).

G 33; 420 Humboldt.

Agricultural Experiment Station

Officers of the Station.

W. M. JARDINE, President of the College.

ADMINISTRATION—

L. E. CALL, Acting Director (till Aug. 31, 1918).

F. D. FARRELL, Director (since Sept. 1, 1918).

JAMES A. KIMBALL, Business Manager.

HUGH DURHAM, Assistant to Director.

AGRICULTURAL ECONOMICS—

THEODORE MACKLIN, in Charge.

W. E. GRIMES, Farm Management.

AGRONOMY—

L. E. CALL, in Charge (till Jan. 20, 1919).

S. C. SALMON, Crops, in Charge (since Jan. 21, 1919).

R. I. THROCKMORTON, Soils.

J. H. PARKER, Plant Breeding.

M. C. SEWELL, Soils.

C. W. MULLEN, Crops.

C. C. CUNNINGHAM, Coöperative Experiments.

B. S. WILSON, Coöperative Experiments.

G. H. PHINNEY, Farm Foreman.

ELIZABETH HARLING, Seed Analyst.

ANIMAL HUSBANDRY—

C. W. McCAMPBELL, Cattle, in Charge.

A. M. PATERSON, Sheep Investigations.

F. W. BELL, Horse Investigations.

E. F. FERRIN, Swine Investigations.

H. B. WINCHESTER, Feeding Investigations.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.

O. W. HUNTER, Dairy Bacteriology.

H. F. LIENHARDT, Poultry Disease Investigations.

P. L. GAINES, Soil Bacteriology.

BOTANY—

L. E. MELCHERS, Plant Pathology, in Charge.

E. C. MILLER, Plant Physiology.

CHEMISTRY—

H. H. KING, in Charge.

J. T. WILLARD, Consulting Chemist.

C. O. SWANSON, General Investigations.

W. L. LATSHAW, Soil, Feeding Stuffs, and Fertilizer Analysis.

E. L. TAGUE, Protein Investigations.

A. G. HOGAN, Animal Nutrition (absent on leave).

J. S. HUGHES, Animal Nutrition.

———, Animal Nutrition.

GEORGE VANDERVEEN, Agricultural Analysis.

DAIRY HUSBANDRY—

J. B. FITCH, in Charge.
H. W. CAVE, Dairy Production.
N. E. OLSON, Dairy Manufactures.
F. W. ATKESON, Supervisor Advanced Registry Testing.
H. M. JONES, Deputy State Dairy Commissioner.
S. J. PEARCE, Deputy State Dairy Commissioner.
CHARLES WILSON, Herdsman.

ENTOMOLOGY—

G. A. DEAN, in Charge.
J. H. MERRILL, Fruit Insect Investigations.
J. W. MCCOLLOCH, Staple Crop Insect Investigations.
W. P. HAYES, Staple Crop Insect Investigations.
M. C. TANQUARY, Staple Crop Insect Investigations.

HORTICULTURE—

ALBERT DICKENS, in Charge.
M. F. AHEARN, Vegetables and Forcing Crops.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Wheat and Flour Investigations.
C. W. OAKES, Miller.
A. E. LANGWORTHY, Feed Control.
F. M. AIMAN, Feed Control.
C. E. BUCHANAN, Feed Control.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.
F. E. FOX, General Investigations.
H. B. MUGGLESTONE, Superintendent of Poultry Plant.

VETERINARY MEDICINE—

R. R. DYKSTRA, in Charge.
C. W. HOBBS, Field Veterinarian.

ZOOLOGY—

R. K. NABOURS, in Charge.
J. E. ACKERT, Parasitology.
R. A. MUTTKOWSKI, Injurious Mammals (absent on leave).
MARTHA DENNY, Genetics.

Branch Experiment Stations.

FORT HAYS—

C. R. WEEKS, Superintendent.
A. L. HALLSTED, Dry-farming Investigations.¹
R. E. GETTY, Forage Crop Investigations.¹
G. C. GIBBONS, Assistant to the Superintendent.
C. R. JACCARD, Forest Nurseryman.

GARDEN CITY—

G. S. KNAPP, Superintendent.
F. A. WAGNER, Dry-land Agriculture Investigations.¹

COLBY—

JOHN J. BAYLES, Superintendent.
J. B. KUSKA, Dry-land Agriculture Investigations.¹

TRIBUNE—

IVAR MATTSO, Superintendent.

1. In coöperation with the U. S. Department of Agriculture.

Engineering Experiment Station

Officers of the Station

W. M. JARDINE, President of the College.

ADMINISTRATION—

A. A. POTTER, Director.

LOUISE SCHWENSEN, Secretary.

APPLIED MECHANICS AND MACHINE DESIGN—

R. A. SEATON, in Charge.

W. B. WENDT, Strength of Materials.

C. E. PEARCE, Machine Design.

———, General Investigations.

———, Assistant.

ARCHITECTURE—

C. F. BAKER, in Charge.

J. D. WALTERS, General Investigations.

K. J. T. EKBLAW, Rural Architecture.

STANLEY A. SMITH, Assistant.

CHEMISTRY—

H. H. KING, in Charge.

P. J. NEWMAN, General Investigations.

CIVIL ENGINEERING—

L. E. CONRAD, in Charge.

F. F. FRAZIER, General Investigations.

M. W. FURR, Assistant.

ELECTRICAL ENGINEERING—

C. E. REID, in Charge.

R. G. KLOEFFLER, General Investigations.

E. W. MARKLE, Assistant.

FARM ENGINEERING—

K. J. T. EKBLAW, in Charge.

W. H. SANDERS, Tractors.

V. H. KERN, Farm Machinery.

PHYSICS—

J. O. HAMILTON, in Charge.

G. E. RABURN, General Investigations.

SHOP PRACTICE—

W. W. CARLSON, in Charge.

E. C. JONES, General Investigations.

STEAM AND GAS ENGINEERING—

A. A. POTTER, in Charge.

J. P. CALDERWOOD, General Investigations.

A. J. MACK, Assistant.

———, Assistant.

———, Assistant.

4—Agr. Col.—6033.

History of the College

The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish, in addition to the literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner-stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a State university at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes hereinafter mentioned, an amount of public lands to be appropriated to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands—

"Shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the provisions of the Morrill Act "are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the State of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7,686.48 acres—an amount selected and found to lie within a railroad grant—was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the federal government with reference to the "land-grant" colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890. This act applied—

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1,000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life, and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from federal funds, the law contains the very significant provision specially authorizing the agricultural colleges to use a portion of this federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotation from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890, the sum of \$5,000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of \$5,000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be \$50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890; provided, that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

The Development of the Kansas Agricultural College

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the State and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief of fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no great changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. Beginning with 1897, the greater stress

was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose of strengthening these phases of educational work. In 1897 four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899 the administration of the institution changed, and during the years that have followed the institution has experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State. The number of professors and other instructors and the student enrollment grew steadily throughout this period up to the time of the outbreak of the war, when this College, along with all others, suffered heavily. Since 1899 additional buildings to the value of about \$500,000 have been erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs. The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to teach them *how to live*, and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgement of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutors, the Experiment Stations, occupying a position of far-reaching power and influence in connection with the most vital interests of the State of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College

offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering, architecture, or any of the various special courses for mechanics. For young women, training is offered in household economics, nutrition, food economics, clothing and textiles, home furnishing, home decoration, etc.

A second large object of the College, made effective through the Experiment Stations, is to investigate the problems of agriculture and the industries. By conducting the researches of the Experiment Stations in close connection with the educational work of the College opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, in the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Division of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the State, conduct seed trains, dairy trains, corn trains, alfalfa trains, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Division of College Extension, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the State government with State industrial and police duties, such as pure-food investigations, control of feeding stuffs and fertilizers, State forestry work, and other similar duties.

The Experiment Stations

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, which is commonly known as the "Hatch Act," and is officially designated as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experiment Station were provided for entirely by the federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5,000, and increasing each year by \$2,000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

"No portion of said moneys exceeding five percentum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land."

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—the means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

In the neighborhood of sixty projects, covering practically all phases of agricultural investigation, are being studied by the members of the Experiment Station staff.

The farms, livestock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

The results of the work of the Experiment Station are published in the form of bulletins, circulars, and scientific papers other than bulletins and circulars. These bulletins are of two classes—those which record the results of research work of a purely scientific character and those which present technical information in a simplified form, suitable for the general reader. The circulars are brief and condensed popular presentations of data which call for immediate application, as well as timely and useful information not necessarily new or original. The scientific papers are usually published as reprints or addresses given before scientific bodies. These reprints contain original information or report definite steps in the progress of investigations under way.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the State. Any person in the State who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: "Agricultural Experiment Station, Manhattan, Kan." Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

CONTROL WORK OF THE STATION

In addition to the work of agricultural investigation, the State has enlarged the activities of the Station along various lines of State executive or control work.

One of the important lines of control work is that of state dairy commissioner. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

"To inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may in connection with the Board of Administration of the College—

"Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

"Condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice cream, wherever he may find them."

Another important State function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established—

"To suppress and eradicate San José scale and other dangerous insect pests and plant diseases throughout the State of Kansas."

The professors of entomology at the Agricultural College and at the University of Kansas are by law designated as two of the five members of the above commission. Acting under the title of State entomologist, they divide between them the territory of the State, for the purpose of inspection.

They are empowered—

"To enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the State of Kansas, for the purpose of inspection, destroying, treating, or experiment upon the insects or diseases aforesaid."

They may treat or cause to be treated "any and all suspicious trees, vines, shrubs, plants, and grains," or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the State without such inspection.

Concerned with the livestock interests of the State is the State Livestock Registry Board, with regard to which there is the following provision (Laws of 1913):

"Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the State of Kansas, shall secure a license certificate for such stallion from the Kansas State Livestock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College."

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: Pure-bred, grade, cross-bred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

By legislative act (Laws of 1909, ch. 49), a "division of forestry" at the Agricultural College is also provided for in the following terms:

"For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a State forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of livestock remedies and commercial feeding-stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of livestock remedy and every brand of commercial feeding-stuff offered or held for sale or sold within the State of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act.

And—

"Except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the acts.

It will thus be seen that the State of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of State importance requiring the application of technical knowledge.

Branch Agricultural Experiment Stations

FORT HAYS BRANCH STATION

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior, October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7,200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress, when through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purpose of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the State legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work.

The land at the Fort Hays Branch Station consists mainly of high, rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plains region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this Station may be divided into two divisions: (A) experimental projects, (B) general farm and livestock work. The experimental projects are as follows: Dry-farming investigations, forage-crop investigations, cereal-crop investigations, forest, nursery and park demonstrations and investigations, farm dairying, and experiments in the feeding and breeding of livestock. All this work is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the development of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry and dairy husbandry suited to this region. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

GARDEN CITY BRANCH STATION

In 1906 the county commissioners of Finney County purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

The land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expenses of pumping and the cost of equipment necessary for plants of this type, which are common in the shallow-water districts between Garden City and Scott City and along the Arkansas Valley. The Experiment Station's investigations in irrigation agriculture are centered at this branch station.

COLBY BRANCH STATION.

The legislature of 1913 provided for the establishment of a branch experiment and demonstration station near Colby, in northwestern Kansas, "for the purpose of advancing and developing the agricultural, horticultural, and irrigation interests of this State and western Kansas." The Station was located upon a tract of three hundred and fourteen acres of land bordering upon the town site of Colby. This land was purchased by the county and deeded to the State for the purposes named above. Operations were begun in March, 1914. Cropping experiments are being conducted under dry-land conditions and under irrigation. Water is being lifted one hundred and fifty feet for irrigating a garden, fruit trees, and a few desirable crops, such as alfalfa, that could not be grown successfully in western Kansas with the natural rainfall. The primary purpose of the Colby Station is to determine the best methods of developing the agriculture of northwestern Kansas and to make it a still more desirable place to live.

TRIBUNE BRANCH STATION

At the Tribune Station experimental and demonstration work is conducted for the benefit of the surrounding territory. Special attention is paid to the problems of producing, storing, and utilizing crops for winter feeding of cattle which in summer graze the extensive range areas of the extreme western part of the State.

The Engineering Experiment Station

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the State of Kansas, and of collecting, preparing, and presenting technical information in a form readily available for the use of the various industries within the State. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

All of the equipment of the various engineering and scientific laboratories and shops and of the College power plant are available for this work, while the personnel of the Station staff is made up of professors and instructors from the various departments of the Division of Engineering and from other scientific departments whose work is directly related to the work of this division.

Among the tests now being carried on are investigations of the effect of freezing, before it has hardened, on the strength of concrete, the road-making properties of various Kansas stones, gravels, and sands, the relative costs of concrete of a given quality when made with and without coarse aggregates, the relative economy of gasoline and cheaper fuels in internal-combustion engines, the comparative advantage of steam and oil traction engines, power-plant economics, the use of gasoline-electric generating sets for isolated plants, the use of the windmill for driving electric generators for farm lighting, the losses in electric transmission lines, and in town and city distribution systems, the mechanical and electrical properties of commercial copper wire used in pole-line construction, the economy of electric cooking and heating devices, and the effect of chemical composition on the durability and protective power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, pipe coverings, insulation for refrigeration, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, farm water supply, sewage disposal, and problems in farm architecture.

A continuous record is being made of the stage of the Kansas river at Manhattan, to be used in computing the flood discharge of that stream, as a basis for designing works for flood protection.

The results of the investigations are published as bulletins and circulars of the Engineering Experiment Station, which are sent free to any citizen of the State upon request. Besides issuing these bulletins, the Station answers yearly many hundreds of requests for information upon matters coming within its field.

Requests for bulletins and general correspondence should be addressed to Engineering Experiment Station, Manhattan, Kan. Requests for information in specific matters should be addressed, so far as it is possible, to the heads of departments in whose fields the particular matters lie.

Grounds, Buildings, and Equipment

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric-car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaded macadamized avenues lead to all parts of the grounds. Cement walks connect the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 1,136 acres of land at Manhattan, valued at \$340,600. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings and needed for drives and ornamental plantings is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the College quarries. A central power plant furnishes steam heat and electric light and power to the buildings, and a plant for the manufacture of producer gas supplies some of the laboratories and shops. The College owns and operates its own system of waterworks and is provided with a complete sewerage system.

AGRICULTURAL HALL (NEW). Erected 1912; cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry. This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station, a complete small flour mill, and laboratories for grain judging. Value of equipment: *Agronomy, \$17,519; Animal Husbandry, \$2,290;

* The figures for equipment are taken from the reports of June 30, 1918.

Dean's Offices, \$1,412; Milling Industry, \$14,405; Poultry Husbandry, \$1,902; College Extension, \$272.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a lecture hall, the College post office, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture, Economics, Education, English, Home Art, and Mathematics. Value of equipment, \$24,288.

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Has a large stage with drop curtain and scenery. Seating capacity, 2,300. Contains also the offices and music rooms of the Department of Music. Value of equipment, \$3,941.

CHEMISTRY ANNEX. Erected, 1876; cost, \$8,000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory. Reconstructed at a cost of \$5,000 after a fire in 1900, the building was used from 1902 to 1911 as a women's gymnasium; since 1911, used by the Department of Chemistry. Value of equipment, \$13,000.

~~DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet.~~ Fitted with modern swinging stalls for eighty head of cows, and arranged in two rows with driveway between. Value of equipment, \$1,194.

DAIRY COMMISSION HALL. Erected, 1888; cost, \$5,000; dimensions, 20 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the state dairy commissioner. Value of equipment, \$1,032.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet, one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, \$3,580.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment: Chemistry, \$34,290; Electrical Engineering, \$27,656; Physics, \$13,163.

DOMESTIC SCIENCE AND ART HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, classrooms and offices of the Department of Domestic Science; the second floor is occupied by the laboratories, classrooms and offices of the Department of Domestic Art. Value of equipment: Domestic Science, \$8,844; Domestic Art, \$6,737; Dean's Offices, \$2,316.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the wood-working shop, was erected in 1876; a series of additions having later

been successively made, the present group is the result. The cost of the whole amounts to \$35,000. A portion of the building is two stories high. On the upper floor, which has a floor area of 9,260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Departments of Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipment. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, \$66,968.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College library and reading rooms, a newspaper reading room, offices of the librarian and his assistants, and the general museum. On the second floor are the offices, classrooms and laboratories of the Departments of Zoölogy, Entomology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics. Value of equipment: Entomology, \$14,134; Zoölogy, \$19,756; History and Civics, \$745; Library, \$140,667.

FARM BARN. Erected, 1913; cost, \$25,000; dimensions, 80 x 160 feet; two stories and basement. Consists of three sections, arranged like the letter H, and a glazed tile silo of 200 tons capacity. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks, and is designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and the show herd. The central section has an office, feed rooms, a washing floor, and a basement containing the engine room. The loft, to which a driveway leads, has storage space for ten carloads of grain and 100 tons of hay and straw and contains the grinding apparatus. This barn is used by the Department of Animal Husbandry.

FARM MACHINERY HALL. Erected, 1870; cost, \$11,250; dimensions, 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a College barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years as an armory. The entire building has been given over for the use of the Department of Farm Machinery, and is filled with all types of farm machinery. Value of equipment, \$3,245.

HORTICULTURAL BARN. Erected, 1889; cost, \$1,000. Contains store-room, granary, and stable room for several horses.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany, Horticulture, and Forestry. Its classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$18,180; Forestry, \$1,195; Horticulture, \$3,700.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. Used from its erection till 1908 by the Departments of Domestic Science and Domestic Art. Basement occupied by the printing plant; first floor taken up by the cafeteria since the summer of 1915, and by offices of the Department of English; second floor divided into general classrooms and offices used by the Departments of Industrial Journalism and Printing, and English. Value of equipment: Cafeteria, \$3,280; English, \$1,000; Industrial Journalism and Printing, \$8,304.

MECHANICAL ENGINEERING HALL. Erected, 1909; cost \$80,000; dimensions, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building contains the general offices of the Division of Engineering, the offices and drafting rooms of the Departments of Civil Engineering, Steam and Gas Engineering, and Architecture, a reading room, an amphitheater for lectures and demonstrations, and the experimental laboratories for applied mechanics, hydraulics, road materials, steam and gas engineering. The engines, turbines, generators, and boilers that furnish power and light for the College are installed in this building. Value of equipment, \$125,532.

NICHOLS GYMNASIUM. Erected, 1911; cost, \$122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Directors of Athletics and Physical Education, a large locker room for men, classrooms and offices of the Department of Modern Languages, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, \$5,652.

REPAIR SHOP. Erected, 1877; cost, \$4,000; dimensions, 32 x 80 feet; one story and basement. At an early period used as a horticultural hall; now the headquarters for general College repairs. Value of equipment, \$1,635.

SCHOOL OF AGRICULTURE HALL. Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site

of the President's house, destroyed by lightning in 1896. Contains classrooms and offices of the School of Agriculture and of the Department of Public Speaking. Value of equipment, \$915.

VETERINARY HALL. Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms, and offices of the Department of Veterinary Medicine and Bacteriology. Value of equipment: Veterinary Medicine, \$26,774; Bacteriology, \$7,660.

In addition to the substantial stone buildings mentioned above the College has a number of other buildings, among them the following:

GREENHOUSES. Erected, 1909; cost, \$7,000; dimensions, 114 x 150 feet. Contains six sections used by various departments, as follows: Horticulture, three; Botany, one; Agronomy, one; Entomology and Zoology, one. Value of equipment, \$2,392.

PLANT MUSEUM. Erected, 1907; cost, \$2,500; dimensions, 20 x 100 feet. Used by the Department of Horticulture. Contains a large number of rare growing plants, including many subtropical species. Value of equipment, \$612.

SERUM BARN. Erected, 1914; cost, \$3,000; dimensions, 92 x 96 feet; contains thirty pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

SERUM BUILDING. Erected, 1914; cost, \$7,000; constructed of brick; dimensions, 24 x 60 feet; two stories.

TRACTION ENGINE LABORATORIES. Erected 1918; cost, \$20,000; two buildings, dimensions of each, 40 x 176 feet. These are two frame buildings on concrete foundations, used originally as barracks for the Student Army Training Corps.

In addition to the equipment listed in the preceding paragraphs, several other important items might well be mentioned, *e. g.*, livestock, valued at \$112,767, and the water tower, heat tunnels, etc., valued at \$63,000.

Library

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On January 1, 1919, the Library contained 62,464 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Faculty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

Reading Rooms.—Three reading rooms are maintained in connection with the Library; the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

Divisional Libraries.—Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

Requirements for Admission

The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Any person who has completed a four-year course of study in any high school or academy accredited by the State Board of Education will be admitted to the freshman class.

Persons who are not graduates of accredited high schools or academies will be admitted to the freshman class if they have completed fifteen acceptable units of high-school work. (A unit is defined to be the work in an accredited high school or academy in five recitation periods a week for one school year.) One who offers fourteen such units will be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time College credits are taken in its place.

In order to enter upon the several curricula without loss of time the following subjects must have been completed:

Curriculum in Agriculture.....	English, three units; physics, one unit; algebra, one unit; geometry, one unit
Curriculum in Veterinary Medicine...	Same as above
Curriculum in Animal Husbandry and Veterinary Medicine.....	Same as above
Curriculum in Industrial Journalism..	Same as above
Curriculum in Home Economics.....	Same as above
Curriculum in General Science.....	English, three units; physics, one unit; algebra, one and one-half units; geometry, one unit
Curricula in Agricultural Chemistry, Industrial Chemistry, and Bio-chemistry	Same as above
Curricula in Engineering.....	English, three units; physics, one unit; algebra, one and one-half units; geometry, one and one-half units
Curriculum in Architecture.....	Same as above

Subjects acceptable for entrance, arranged in eight groups, together with the number of units that may be offered, are shown as follows:

GROUP I	
English	Three or four units

GROUP II Foreign Languages	Latin, one, two, three, or four units
	Greek, one, two, three, or four units
	German, one, two, three, or four units
	French, one, two, three, or four units
	Spanish, one, two, three, or four units
GROUP III Mathematics	Elementary algebra, one or one and one-half units
	Plane geometry, one unit
	Solid geometry, one-half unit
	Plane trigonometry, one-half unit
	Advanced algebra, one-half unit
GROUP IV Natural Sciences	Physical geography one-half or one unit
	*Physics, one unit
	*Chemistry, one unit
	*Botany, one-half or one unit
	*Zoölogy, one-half or one unit
	*Physiology, one-half or one unit
	*General biology, one-half or one unit
GROUP V History and Social Sciences	*General science, one-half or one unit
	Greek and Roman history, one unit
	Medieval and modern history, one unit
	English history, one unit
	American history, one unit
	Economics, one-half or one unit
	Sociology one-half unit
GROUP VI Normal Train- ing Subjects	Civics, one-half or one unit
	Psychology, one-half unit
	Methods and management, one-half unit
	Higher arithmetic, one-half unit
	Reviews
	Grammar, twelve weeks
	Geography, twelve weeks
GROUP VII Industrial Subjects	Reading, twelve weeks
	*Music, one unit
	*Agriculture, one-half or one, two, three or four units
	*Drawing, one-half or one unit
	*Woodwork one-half, one, or two units
	*Forging, one-half or one unit
	*Domestic science, one-half, one, or two units
GROUP VIII Commercial Subjects	*Domestic art, one-half, one, or two units
	Commercial law, one-half unit
	Commercial geography, one-half unit
	Bookkeeping, one-half or one unit
	*Stenography and typewriting, one-half or one unit

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is registered in the senior class unless all

* In courses consisting of laboratory work wholly or in part, two periods of laboratory work are to be considered the equivalent of one recitation period.

deficiencies of the preceding years have been provided for. Candidates for graduation must make up all deficient subjects before the beginning of the second semester of the senior year. No student is considered a candidate for graduation the next spring who is deficient more than three full subjects in addition to his regular assignment at the beginning of the first semester. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any term, is allowed to carry extra work during the succeeding term.

ADVANCED CREDIT

At the discretion of the President, students who present certificates showing credits for college work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be accepted as substitutions or electives. Candidates must present to the Committee on Advanced Standing their high-school and college credits certified to by the proper authorities. It is requested also that a college catalogue covering the period of attendance be furnished with the above credentials. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Monday, September 8, 1919; Tuesday, January 27, 1920; and Friday, May 28, 1920.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the Committee on Admission a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose.

It is greatly to the advantage of the prospective student to see to it that this blank, properly filled out and *indicating the course he wishes to take here*, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar before the first of September. This will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait for his turn to meet the Committee on Admission.

LATE REGISTRATION

A considerable amount of extra work and a great deal of confusion is caused by the neglect of students to enroll at the time set for that purpose, and a fee of \$1 will be charged those who enroll after the time fixed for the close of registration unless they present a good excuse for their delay.

SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainment, the College admits as special students those who are twenty-one years of age or older, without requiring them to pass the regular examinations, provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) they do superior work in the subjects assigned.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED
RELATIONS WITH THE COLLEGE

(Graduates admitted without examination)

Abilene	Berryton	Conway Springs
Abbyville	Blue Mound	Corning
Ada	Blue Rapids	Cottonwood Falls
Admire	Bonner Springs	(Chase County)
Agenda	Bronson	Council Grove
Agra	Brookville	Courtland
Alden	Brownell	Covert
Allen	Bucklin	Cuba
Alma	Buffalo	Culver
Almena	Bunkerhill	Cunningham
Altamont	Burden	Delia
(Labette County)	Burlingame	Delphos
Alta Vista	Burlington	Denison
Alton	Burns	Denton
Altoona	Burr Oak	Derby
Americus	Burrton	De Soto
Andover	Bushong	Dexter
Anthony	Caldwell	Dighton
Anthony	Caney	(Lane County)
(Spring Township)	Canton	Dodge City
Argonia	Carbondale	Dodge City
Arkansas City	Cassoday	(Saint Mary of the
Arlington	Cawker City	Plains Academy)
Asherville	Cedar	Douglass
Ashland	Cedar Vale	Downs
Assaria	Centralia	Dunlap
Atchison	Chanute	Easton
Atchison	Chapman	Edna
(Mount Saint Scholastica	(Dickinson County)	Edwardsville
Academy)	Chase	Effingham
Athens	Cheney	(Atchison County)
Atlanta	Cherokee	Eldorado
Attica	(Crawford County)	Elkhart
Atwood	Cherryvale	Ellinwood
(Rawlins County)	Chetopa	Ellis
Auburn	Cimarron	Elsmore
Augusta	Circleville	Ellsworth
Axtell	Clafin	Elwood
Baldwin	Clay Center	Emporia
Baldwin	(Clay County)	Emporia
(Baker University	Clayton	(Normal High School)
Academy)	Clearwater	Englewood
Barclay	Clifton	Enterprise
Barnard	Clyde	Erie
Barnes	Coats	Esbon
Baxter Springs	Codell	Esbridge
Bazine	Coffeyville	Eudora
Beattie	Colby	Eureka
Belle Plaine	(Thomas County)	Everest
Belleville	Coldwater	Fairview
Beloit	Colony	Falun
Belpre	Columbus	Florence
Benedict	(Cherokee County)	Ford
Bennington	Concordia	Formoso
Bentley	Concordia	Fort Scott
Benton	(Nazareth Academy)	
Bern		

Fowler	Kansas City	Miltonvale
Frankfort	(Argentine)	(Wesleyan Academy)
Fredonia	(Catholic)	Minneapolis
Fulton	(Central)	Minneola
Galena	(Sumner)	Moline
Galva	(Wilson)	Montezuma
Garden City	Keats	Moran
Garden Plain	Kensington	Morehead
Gardner	Kincaid	Morland
Garfield	Kingman	Morganville
Garnett	Kinsley	Morrill
Gaylord	Kiowa	Mound City
Geneseo	Kipp	Moundridge
Girard	Kirwin	Mound Valley
Glasco	La Crosse	Mount Hope
Glen Elder	La Cygne	Mulberry
Goddard	La Harpe	Mulvane
Goff	Lakin	Muscotah
Goodland	Lane	Narka
(Sherman County)	Lausing	Natoma
Great Bend	Larned	Neodesha
Greeley	Latham	Neosho Falls
Greenleaf	Lawrence	Neosho Rapids
Greensburg	Lawrence	Ness City
(Kiowa County)	(Oread)	Netawaka
Grenola	Leavenworth	Newton
Gridley	Leavenworth	Newton
Grinnell	(Catholic High School)	(Bethel College Academy)
Gypsum	(Saint Mary's Academy)	New Ulysses
Halstead	Lebanon	(Grant County)
Hamilton	Lebo	Nickerson
Hamlin	Lecompton	(Reno County)
Hanover	Lenora	Northbranch
Hardtner	Leen	(Northbranch Academy)
Harlan	Leoti	Norton
Harper	(Wichita County)	(Norton County)
Hartford	Le Roy	Nortonville
Harveyville	Lewis	Norway
Haven	Liberal	Norwich
Havensville	Lincoln	Oakland
Haviland	Lindsborg	Oakley
Hays	Lindsborg	Oberlin
Hazelton	(Bethany College	(Decatur County)
Healy	Academy)	Offerle
Herington	Little River	Oketo
Hesston	Logan	Olathe
(Hesston Academy)	Longford	Olsburg
Hiawatha	Louisville	Onaga
Highland	Lovewell	Oneida
Hill City	Lucas	Osage City
Hillsboro	Luray	Osawatomie
Hillsboro	Lyndon	Osborne
(Tabor College Academy)	Lyons	Oskaloosa
Hoisington	Macksville	Oswego
Hollenberg	Madison	Ottawa
Holton	Mahaska	Ottawa
Horton	Malze	(Ottawa University
Howard	Manhattan	Academy)
Hoxie	Manhattan	Overbrook
(Sheridan County)	(Sacred Heart Academy)	Oxford
Hoyt	Mankato	Ozawkie
Hugoton	Maplehill	Palco
(Stevens County)	Marion	Paola
Humboldt	Marquette	Paola
Hutchinson	Marysville	(Ursuline Academy)
Independence	McCune	Paradise
(Montgomery County)	McDonald	Parkersville
Ingalls	McLouth	Parsons
Inman	McPherson	Pawnee Rock
Iola	McPherson	Paxico
Irving	(Central College Academy)	Peabody
Isabel	(McPherson College	Perry
Jarbalo	Academy)	Phillipsburg
Jetmore	Meade	Pittsburg
(Hodgeman County)	Medicine Lodge	Plainville
Jewell	Melvern	Pleasanton
Johnson	Meriden	Plevna
(Stanton County)	Merriam	Pomona
Junction City	Mildred	Portis
Kanopolis	Milton	Potter

Potwin	Sedan	Valley Center
Powhattan	Sedgwick	Valley Falls
Pratt	Seneca	Vermillion
Preston	Severance	Vinland
Pretty Prairie	Severy	Viola
Princeton	Sharon	Wakeeney
Protection	Sharon Springs	(Trego County)
Quenemo	Silver Lake	Wakefield
Quinter	Simpson	Waldo
Randall	Smith Center	Walnut
Randolph	Soldier	Walton
Ransom	Solomon	Wamego
Reading	Spearville	Washington
Redfield	Spivey	Waterville
Republic	Spring Hill	Wathena
Richmond	Stafford	Waverly
Riley	Stark	Webster
Robinson	Sterling	Welda
Rock Creek	Stilwell	Wellington
Rosalia	Stockton	(Sumner County)
Rosedale	Summerfield	Wellsville
Rose Hill	Sylvan Grove	Westmoreland
Rossville	Sylvia	Westphalia
Rozel	Syracuse	Wetmore
Russell	Tampa	Wheaton
Russell Springs	Tescott	White City
Sabetha	Thayer	White Cloud
Saffordville	Tonganoxie	Whitewater
Saint Francis	Topeka	Whiting
Saint John	Topeka	Wichita
Saint John	(Catholic High School)	Wichita
(Antrim)	(College of the Sisters of	(Friends University
Saint Marys	Bethany)	Academy)
Salina	(Highland Park High	(Mount Carmel Academy)
Salina	School)	Williamsburg
(Kansas Wesleyan	Washburn College	Willmore
Academy)	Academy)	Wilsey
(Sacred Heart Academy)	Toronto	Wilson
Santa Fe	Towanda	Winchester
(Haskell County)	Tribune	Windom
Savonburg	(Greeley County)	Winfield
Sawyer	Troy	Winona
Scandia	Turon	Woodbine
Scott City	Udall	Woodston
Scranton	Utica	Yates Center

Degrees and Certificates

For graduation, one must complete one of the four-year courses as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military science or physical training, is about 134 hours, or semester credits, a semester credit being one hour of recitation or lecture work, or three hours of laboratory work a week, for one semester of eighteen weeks. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the Faculty.

DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year curriculum in agriculture, mechanical engineering, electrical engineering, civil engineering, flour-mill engineering, architecture, home economics, industrial journalism, agricultural chemistry, biochemistry, industrial chemistry, or general science.

The degree of doctor of veterinary medicine (D. V. M.) is conferred upon those completing the four-year course in veterinary medicine.

The degree of bachelor of agriculture is conferred upon students who have completed the freshman and sophomore work of the four-year course in agriculture, who have been conspicuously successful in farming for a period of five years under the supervision of the faculty of the College, and who have furnished the faculty, through the Dean of the Division of Agriculture, acceptable reports of their work and progress.

CERTIFICATES

An appropriate certificate is granted upon completion of any one of the following:

1. The three-year curriculum in music.
2. The first two years of the four-year course in agriculture.*
3. The short course in agriculture.
4. The two-year curriculum in public-school music.
5. The one-year course in lunch-room management.
6. The housekeepers' course, lasting fifteen weeks.
7. The eight-week creamery short course.
8. Any one of the short courses in engineering.

* Under certain conditions and restrictions, students of mature years who cannot spend four years in college, and who may be applicants for the degree of bachelor of agriculture or for the certificate in agriculture, may, on the completion of all the work required in the freshman year have the privilege of selecting such courses in advance of the sophomore year, under the advice and with the approval of the Dean of the Division of Agriculture, as may be especially adapted to their needs; but in no case can courses based on pre requisites not yet completed be undertaken.

ADVANCED DEGREES

The degree of master of science is conferred upon graduates of this College and upon those of other institutions, upon complying with conditions, the details of which vary with the undergraduate course of study pursued by the student, and the lines in which the graduate study is taken.

From graduates of standard institutions, including graduates of this College of the class of 1917 or later, nine months of residence and at least thirty-two semester hours of work are required. In case the undergraduate work previously taken does not prepare adequately for the graduate work proposed, deficiencies must be made up by study of any necessary undergraduate subjects; for these credit is not allowed on the graduate work proper.

Approximately two-thirds of the graduate work is given to a major subject and one-third to one or more minors. The nature and the distribution of the major and the minors is determined in each individual case by a committee consisting of the dean of the division and the head of the department in which the major is to be taken. The minor or minors must be taken in departments other than that in which the major work is done. Two-thirds of the total graduate credits may be allowed on account of original research, and four credits on the major or minors may be granted for research conducted in connection with instructional duties or departmental investigations in this institution or elsewhere. Applicants for the master's degree are required to have a reading knowledge of one foreign language before receiving their degree.

A candidate for the master's degree must present a thesis consisting of a clear statement of the investigation of some worthy original problem. This is in the field of the student's major line of study, and is evaluated for credit against the major requirements. The preliminary copy of the thesis must be submitted for approval previous to April 1 of the year in which the degree is to be conferred. Two complete copies of the thesis, as approved, must be prepared, one for deposition in the College library, the other for the department in charge of the investigation recorded. These copies must be in hand in satisfactory form before May 15 of the year in which the degree is to be conferred.

A candidate for the master's degree is subject to a rigid oral examination, covering both the general and special fields of his preparation, and including his thesis, by a committee consisting of his dean and the heads of the departments in which his major and regular minors have been taken.

Immediate supervision of the assignment of a graduate student is in charge of the dean of the division in which the major work is done, but the full responsibility for the successful conduct of the graduate work is lodged in a representative standing committee of the Faculty, and this committee has the right to pass on all courses offered, on all assignments taken out, and on the standing of all graduate students.

A senior student whose time is not fully occupied may, by arrangement with the dean of the division and the head of the department in which he expects to do his major work, be assigned to subjects that will count toward the degree of master of science.

For graduates of this institution, up to and including the class of 1916, in addition to the requirements as stated in the foregoing, thirty-two semester hours, or their equivalent, are required. These additional credits are designated as supplementary minors, and are derived from studies that are intended to strengthen the student's general preparation. The supplementary minors must be in subjects of College grade, and may be obtained in residence, by correspondence, or at other approved institutions. Credits due a student on account of junior or senior honors are applied against supplementary minors.

There are a limited number of fellowships open to graduate students. See elsewhere in this catalogue the paragraph on "Fellowships."

PROFESSIONAL DEGREES IN ENGINEERING AND ARCHITECTURE

Graduates in engineering or in architecture from this College previous to 1917 who have been engaged in engineering or architectural practice for a period of five years or more, and graduates in 1917 or later who have been engaged in engineering or architectural practice for a period of three years or more, will be granted the professional degrees of M. E., C. E., E. E., Agr. E., F. M. E., or Architect under the following conditions:

The graduate to be eligible to a degree must submit a statement of his experience and a thesis covering some phase of his practice. This thesis and experience must be approved by the head of the department in which the degree is requested, by the Dean of the Division of Engineering, and by the College Committee on Graduate Study, before the granting of such a degree will be recommended to the College Faculty and to the Board of Administration.

General Information

DUTIES AND PRIVILEGES

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of sound and rational character, and toward the formation of high standards of personal honor and ideals of conduct, is given by the various Christian organizations of the College and the town. Every student is accordingly expected to render a good account of himself in the College community life. For those who are high-minded and reasonable, no other requirements need be expected. On the other hand, the demands of the College life leave no room for the idle or self-indulgent, for those who are too reckless to accept reasonable or wholesome restraint, or for those who are too careless or indifferent to take proper advantage of their opportunities. The College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students cannot honorably leave the College before the close of a semester except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting monthly, admits to membership all instructors and students interested in science. Papers given at the meetings of the Science Club represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members. The numerous literary and professional societies, which are described elsewhere in the catalogue under the title "Student Organizations," also afford excellent training in their diverse lines.

At various times during the year the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

There is no charge for tuition. A matriculation or entrance fee of \$5 for residents of Kansas, or \$10 for nonresidents, is charged all students in College curricula or in the School of Agriculture. This fee is not charged summer school students. An incidental fee of \$5 a semester or summer term for residents of Kansas, or \$10 a semester or summer term for nonresidents is also charged. Each student in the College or School of Agriculture pays with his incidental fee a sick-benefit fee of \$1 for each semester or summer term. Short-course students pay no matriculation fee. Eight-week short-course students pay an incidental fee of \$3 and a sick-benefit fee of 50 cents. Students in short courses of more than eight weeks in length pay an incidental fee of \$5 and a sick-benefit fee of \$1 per term. The sick-benefit fee entitles a student to receive the service of the College physician for any illness contracted while in College. The fee does not include the cost of medicine, surgical operations, reduction of fractures, hospital fees, or the treatment of chronic conditions. As far as possible, and provided the students requesting such services from within the city limits, the College physician visits in their rooms students who are too ill to go to the physician's office.

For unexcused late registration the student is charged one dollar. On graduation students pay a commencement fee of \$5 to cover the cost of the diploma and other commencement expenses. In all laboratories students are required to pay for supplies used and for apparatus broken or lost. Class instruction in music is free, but fees are charged for individual instruction. (See Department of Music for statement of music fees.)

Rooms are not furnished by the College. They are readily obtainable in the city at a cost of from \$8 to \$14 a month for a room suitable for two occupants. Less desirable quarters and less desirable locations may be obtained at a lower rate. There are great differences in the accommodations offered. Those for which the higher prices are charged are modern in all respects, and light, heat, and bath are included.

The cost of board depends largely upon individual requirements. In clubs and private boarding houses the cost is usually from \$5 to \$7 a week. Students may board themselves at a smaller money outlay. The College operates a first-class cafeteria, where all meals may be obtained, excepting on Sundays, at moderate prices. Food is furnished at cost and the expense to the student depends upon the care and judgment which he employs. By use of the cafeteria students may reduce the expense of board to \$3.50 per week.

The expense for laundry may be estimated at from 40 to 75 cents a week depending upon individual requirements.

The average cost of textbooks is about \$8 a semester in most of the curricula. For the first semester the cost is about \$12, and there is considerable variation from term to term and in the different curricula.

Each young woman in physical training must have an approved gymnasium suit, costing about \$4.50.

BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the Secretary of the Young Men's Christian Association, to the Secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, young men should go directly to the Y. M. C. A. building, and the young women to the Y. W. C. A. offices at the College, taking the street car from either depot. The cars from Union Pacific station pass directly by the association building. Students leaving the Rock Island station on street car should ask for transfer to the line that passes the association building. For three days before the opening of the fall semester and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects cannot be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a semester, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1,200 a month, at rates varying from 20 to 35 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country. Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. Indeed, about one-quarter of the students support themselves wholly, while a third support themselves in part.

False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged.

STUDENT LOAN FUNDS

THE ALUMNI LOAN FUND. The Alumni Association of the Kansas State Agricultural College has created a loan fund, chiefly by means of payments by which the alumnus is relieved from further regular dues in the association. Members are due to pay the association \$1 a year, and on payment of \$20 in one sum they are relieved from such dues. The fund so created is lent to students at 5 percent per annum. The fund is administered by a committee appointed by the directors of the Alumni Association. The committee announces no specific rules governing the granting of loans, but in general gives preference to smaller amounts on short time over larger amounts which cannot be paid for several years. Alumni are urged to add to the funds thus made available to worthy students. Students wishing loans from this fund may address Dean J. T. Willard, Chairman of the Alumni Loan Fund Committee, Manhattan, Kan.

THE HENRY JACKSON WATERS LOAN FUND. The Henry Jackson Waters loan fund consists of the royalties received from the Kansas sales of President Waters' textbook, *The Essentials of Agriculture*. The royalties so far have amounted to more than \$1,000, which sum has been augmented by gifts of \$100 each from Senator Capper and L. R. Eakin, of Manhattan, and by smaller amounts received from some others. The entire amount has been loaned nearly all the time. The fund is administered by a committee appointed by the President of the College and approved by the Board of Administration. The rules for the loans are likewise approved by the Board. The rules allow emergency loans of \$25 to any student who has completed two semesters of work in this College. Juniors may borrow \$100 and seniors may borrow \$150. Applications for loans should be made to Professor Albert Dickens, Chairman of the Waters Loan Fund Committee, Manhattan, Kan.

THE COLLEGE SOCIAL CLUB LOAN FUND. The College Social Club voted to use a balance in its treasury (\$40) for a loan to some one of the young women students. The loan is administered by a committee representing the College Social Club. Further information regarding this fund can be obtained by addressing Dean Mary P. Van Zile, Manhattan, Kan.

THE STATE FEDERATION OF WOMEN'S CLUBS' LOAN FUND. Each year several of the young women students of the Kansas State Agricultural College are beneficiaries of the State Federation of Women's Clubs through the administration of its liberal young women's student loan fund. Information regarding this fund can be obtained by addressing Dean Mary P. Van Zile, Manhattan, Kan.

PRIZES AND MEDALS

STOCK JUDGING. The Saddle and Sirloin Club offers four medals, one gold, one silver, and two bronze, to students obtaining the highest four places in the club's stock-judging contest. The same organization offers prizes of books for stock judging. The Faculty of the Department of Animal Husbandry offers prizes of books or papers on stock judging.

DAIRY JUDGING. The Student Dairy Association each year holds a dairy-judging contest, and offers a gold, a silver and a bronze medal to students obtaining the highest three places.

PLAY WRITING. The Purple Masque Dramatic Fraternity offers each year a prize of \$50 for the best original play written by a student of the Kansas State Agricultural College and suitable for presentation by the fraternity.

ORATORY. The literary societies, through the Oratorical Board, offer each year, in the Intersociety Oratorical Contest, the following prizes:

First prize, gold medal and \$25.

Second prize, silver medal and \$15.

Third prize, bronze medal and \$10.

The Oratorical Board also finances the sending of a representative from the College to the annual Peace Oratorical Contests, to the winners of which valuable prizes in money are awarded.

The Department of Public Speaking sends to the annual Missouri Valley Contest an orator as the representative of the College. In this contest valuable prizes in money and medals are awarded.

SHORT-STORY WRITING. The Quill Club offers annually a gold medal to the student of Kansas State Agricultural College writing the best short story in a contest held by this organization.

MILITARY TRAINING. In the Department of Military Training prizes and medals are offered as follows:

1. The Knostman cup, offered by the Knostman Clothing Company, of Manhattan, to the company winning the intercompany basket-ball series.
2. The Henderson Ames cup, donated by the Henderson Ames Company, of Kalamazoo, Mich., to the company winning the outdoor Henderson Ames match.
3. The Governor Hodges cup, donated by ex-Governor Hodges to the company having the highest percentage on outdoor range.
4. The Metcalf cup, donated by General W. S. Metcalf to the member of the Rifle Club having the highest aggregate in gallery matches of the United States military colleges.
5. A saber or pistol to the captain having the best-drilled company.
6. A silver-mounted saber knot to the first lieutenant of the best-drilled company.
7. A silver-mounted saber knot to the second lieutenant of the best-drilled company.
8. A silver medal to the corporal of the best-drilled squad.
9. A bronze medal to each private of the best-drilled squad.
10. A gold medal to the best-drilled cadet.

The team members of the College Rifle Club winning the series of intercollegiate matches in gallery-practice competition are issued individual marksmanship medals by the National Rifle Association of America.

SCHOLARSHIPS

MILLING INDUSTRY. The Kansas Flour Mills Company offers \$300 annually to advanced students specializing in milling industry. This sum has been divided into three scholarships which are open to students in the Division of Agriculture, General Science, and Mechanic Arts who are specializing in flour milling and other milling-industry work. They are awarded on or before June 1 of each year, and except in unusual cases are not awarded to students below junior standing. Other things being equal, preference is given to residents of the State of Kansas.

In awarding these scholarships, the following points regarding the student are considered: Course of study pursued, scholarship, character and personality, and financial condition. The stipend is divided into ten monthly payments, the first payment being made September 1 and the last June 1.

DEBATE. In the Department of English two scholarships of the value of \$100 each, one for men and one for women students, are offered annually for proficiency in intercollegiate debating.

FELLOWSHIPS

Fellowships have been established for some years by action of the Board, and are available in several departments of the College. Fellowships are granted to graduate students, who are to devote one-half of their time during the nine months of the regular school year to such work as may be laid out for them by the head of the department in which the fellowship is held. The remaining half-time is to be devoted to graduate study. These fellowships each yield \$400 annually. Applications for such fellowships should be made to the dean of the division in which the applicant expects to do his major work.

Two fellowships, each two years in duration, are established in engineering. The holder is expected to devote eleven months of the year to the work laid out, and receives from the College \$500 annually. To be eligible for appointment, the applicant must be a graduate of a technical course of a school or college of recognized standing. Preference will be given to those who have had some commercial experience along the lines of research to be followed. Applications for engineering fellowships should be made to the Dean of the Division of Engineering, and should state the lines of work that the applicant particularly desires to follow.

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Registrar. Financial matters are handled through the office of the Business Manager, State Board of Administration, Topeka, Kan.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to

give information, should be addressed to the heads of the departments concerned with the work regarding which information is sought.

Applications for farmers' institutes should be made as early in the season as possible, to the Division of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed: Director of the Agricultural Experiment Station, Manhattan, Kan.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

STUDENT ASSEMBLY

The Student Assembly is held one hour each week. At this time the library, offices, classrooms, and laboratories are closed and the students gather in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the addresses delivered by the President and by members of the Faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment. Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published and printed at the College weekly by the Department of Industrial Journalism and Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any address for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Division of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members. The students of the College publish a semi-weekly periodical, *The Kansas State Collegian*, in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each semester. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor.

Any student who receives a grade of E for the term, in any subject, and whose absences for all causes from the class in such subject do not

exceed one-tenth of the number of times the class is scheduled to meet during the semester, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are held on the fourth Saturday of each semester. A student who has received the grade C is entitled to take such special examination, provided the instructor or the department head be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F.

Permission for examination in subjects not taken in class must be obtained on recommendation of the professor in charge, from the dean of the division in which the student is assigned. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES

Student grades are designated by the letters E, G, M, P, C, F, and U, having the following significance and order of rank:

The grade E designates really distinguished achievement, and is the net resultant of exceptionally good mental ability in conjunction with serious application. It is expected that this grade will not include more than ten percent of all grades given a class, and usually will include about five percent.

The grade G represents superior achievement, better than that exhibited by the average student, but not distinguished. It is recognized as a mark of considerable honor and is the resultant of high ability and fair application, or of fair ability and serious application. The percentage of students assigned this grade will depend somewhat upon the number assigned grade E, but the sum of grades E and G should approximate twenty-five percent of all grades assigned.

The grade M represents the standing of about half of all students in the College. It means achievement equal to that of the average of students, and includes about half of all student grades. It indicates neither superior nor inferior accomplishment.

The grade P, meaning passed, represents achievement of a grade below that of the average of students. It indicates a student's position as being in the upper part of the lower fourth of the class and his work as being such as may be described as poor, or inferior. The number of grades P awarded, together with the grades C and F, should not, on the whole, exceed twenty-five percent of all, and are expected to include about that proportion.

The grade C, meaning conditioned, is the symbol used to represent two types of inferior work: (a) that which is deficient in quality, and (b) that which is satisfactory as to quality but inadequate as to quantity. The results of examinations to remove conditions are reported

simply as P (passed) or F (failed), and such examinations not taken, or taken and not passed, are recorded as F.

The grade F, meaning failed, is used to indicate work that is so unsatisfactory as to require that the work be repeated in class or under an approved tutor.

The letter U, meaning unfinished, is reported when, in the judgment of the instructor, the student deserves further time to complete work which has been interfered with by illness or other excusable cause of absence or disability. This is only a temporary report and in no way prejudices the student's final grade in a course.

PENALTIES

A student who, at the end of the semester, receives grades below passing in fifty percent or more of the work to which he is assigned is required to leave College for at least one semester unless there are sufficiently extenuating circumstances, in which case his dean may suspend the rule and allow an assignment to twelve semester credits of work.

Any student who, at the end of a semester, receives grades below passing in twenty-five percent of his assigned work is allowed not more than seventy-five percent of regular work the next semester.

Any student who is found to be persistently inattentive in his College work is at once temporarily suspended by his dean, and reported to the President for permanent suspension.

HONORS

In each of the divisions of the College "junior honors" are awarded at Commencement to not more than five percent of the junior class having the highest standing up to the close of the junior year.

In a similar manner "senior honors" are awarded to not exceeding five percent of the senior class having the highest standing up to the close of the senior year.

HONOR SOCIETIES

A chapter of Phi Kappa Phi, an honor scholarship fraternity, membership in which is open to honor graduates of all departments of American universities and colleges, was installed at the Kansas State Agricultural College on November 15, 1915. The eligibility of undergraduates to membership is determined on the basis of their scholarship. The candidates are elected to membership at the October and April meetings of the chapter. Besides this, there are a number of honor fraternities, sororities and societies which are open to students in different divisions of the College or in different activities. These are treated later under the heading "Student Organizations."

CREDITS FOR EXTRA WORK

Activities connected with the College, but not provided for by any of the curricula, either as required subjects or as electives, are designated as *extra subjects*.

No credit is given for extra work of any kind unless the student is regularly assigned to it in accordance with the general rules governing

assignments, and it is done under the constant supervision of a College officer, who sees that a proper standard is maintained and reports a grade for record.

No student may be assigned to extra work for credit except upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

Credits earned for extra work may be counted as part or all of the electives in any of the College courses. In courses that do not include electives, credits for extra work are available only as substitutions for required work, and must be approved in the regular way before becoming effective. A total of not more than eight semester credits may be allowed a student for extra work, and not more than two of these may be obtained in any one semester.

The number of semester credits that may be allowed for extra work is as follows:

Subject.	Per semester.	Total.
Physical Training	1	4
Orchestra	1	4
Band	1	4
Choral Society	1	4
Debate	2	4
Oratorical Contest	2	4
<i>Kansas State Collegian</i> journalism.....	1	4

BIBLE STUDY

Bible study is an elective. Two semester credits are granted for each completed one-year course. Credit may be granted to any one student for not more than two courses. Teachers of classes are to be approved as tutors, and the supervision of the work is placed in the Department of Education. This department also conducts the examinations for credit in Bible study.

COURSE NUMBERS

Each course offered bears a number indicating in a general way the standing of students for whom it is given. Courses for undergraduates bear numbers 101 to 199, courses for undergraduates and graduates bear numbers 201 to 299, and courses for graduates only bear numbers 301 to 399. The numbers 1 to 29 are applied to studies offered for short course students, the numbers 31 to 49 are assigned to summer school subjects not taught for entrance credit or for college credit, and subjects which give credit in the School of Agriculture are numbered 51 to 99.

This system of numbering applies to each of the departments of the College, not to the college as a whole or to the several divisions.

CLASSES

The minimum numbers for which classes are organized are as follows:

School of Agriculture.....	18
Freshmen or sophomores.....	12
Juniors or seniors.....	7

This rule is varied only by special permission of the Board of Administration.

Division of Agriculture

F. D. FARRELL, *Dean*

The teaching of rational, practical agriculture is fundamental to development in a state whose principal industries are agricultural. Kansas prospers in direct proportion to the productivity of her soil and the effectiveness with which it is utilized. The unit of production is the acre, and the successful farmer is the one who can produce economically a maximum quantity of the best quality of agricultural commodities to the acre.

In order to do this it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of livestock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings and equipment of the farm and farm home with modern conveniences; the best methods of marketing the products of the farm; and in addition to all this, how to make the farm home the center of influence for good citizenship in the community.

A man may learn many of these things through practical experience and thus become an exponent of modern farming. But practical experience alone is slow and expensive. The Agricultural College furnishes a means of acquiring systematic training in agriculture which fits young men adequately for the farm for a moderate expenditure of time and money.

EQUIPMENT

The facilities for such training at this College are of a high order. The College owns 1,136 acres of land, which is used for investigation, instruction, and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, is one of the best examples of ornamental tree planting and forestry in the state. Students working daily amid such surroundings can scarcely fail to gain an appreciation or love for the beautiful. A tract of 320 acres is devoted to the work in agronomy; for horticulture and forestry work, 80 acres are used; for dairy work, about 160 acres; and for animal husbandry, about 400 acres. The herds and flocks contain all important breeds of dairy and beef cattle, hogs, horses, and sheep. Many of these animals have won championships at local and state fairs in recent years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United

States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their places in public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the communities they serve. They must have a broad groundwork in cultural and ethical training, which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in veterinary science, as in its curriculum in agriculture, seeks to emphasize the value of the man as a man, as much as his value as a specialist.

CURRICULA IN AGRICULTURE

The various needs of the student of agriculture are met by the following curricula:

A six-year curriculum in animal husbandry and veterinary medicine.

A four-year curriculum in agriculture.

A four-year curriculum in veterinary medicine.

Various short courses. (The work of these courses is discussed in another section of the catalogue.)

DEGREES AND CERTIFICATES

The six-year curriculum in animal husbandry and veterinary medicine leads to the degree of bachelor of science in agriculture at the end of four years, and to the degree of doctor of veterinary medicine at the end of two more years. The four-year curriculum in agriculture leads to the degree of bachelor of science in agriculture. The four-year curriculum in veterinary medicine leads to the degree of doctor of veterinary medicine. Short-course certificates are discussed in the descriptions of short-course work.

THE CURRICULUM IN AGRICULTURE

The four-year curriculum in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes the curriculum will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities for men who by nature and training are adapted to the work. The United States Department of Agriculture, the state colleges and departments of agriculture, high schools, private institutions of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year curriculum. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that lie back

of every operation in farming, in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail the result may be a failure. To understand the conditions which should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher of farming must possess both kinds of training, and the curriculum has been revised with this fact in view, and has been so arranged that *the student begins his practical training in agriculture on the first day he enters College.*

ANALYSIS OF THE CURRICULUM

One hundred thirty-one semester credits in addition to military science are required for graduates, as follows:

	Semester credits.	
Prescribed agriculture	43	
Electives in agriculture, required with their prerequisites	21	
Required in agriculture	—	64
Prescribed in nonagriculture	45	
Electives in nonagriculture, required	6	
Electives that may be nonagriculture	16	
Total allowed in nonagriculture	—	67
Required in military science	—	4
Total semester credits for graduation		135

As shown in the above general outline and in the tabulated curriculum given hereafter, the candidate for graduation must have completed one hundred thirty-five College semester credits. The twelve major electives required must be taken from some one of the departments of the Division of Agriculture. The nine minor electives must support the major work. They may be taken from more than one department, and may even be selected from departments in other divisions of the College, but they must directly strengthen the student's preparation in agriculture. At the discretion of the student, twenty-one elective credits may be nonagricultural. However, six semester credits of the junior electives and the seven senior semester credits, designated "free electives," may be earned in any College credit courses and may be chosen without restriction. Any candidate for a degree in agriculture must also have had at least six months' farm experience approved by the Dean of the Division of Agriculture.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, botany, English, and physics, practical studies in the physiology of plants and plant diseases, farm crops, livestock, dairying, poultry, and horticulture. These two years give the student a general knowledge of the whole range of practical agriculture, more than one-third of his time in these freshman and sophomore years being devoted to practical agricultural subjects.

During the junior and senior years the student continues his studies of fundamental science and learns to apply science to practical agriculture. He is led step by step to understand the scientific relation of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to determine in which of the general lines he will find that which best suits his needs or liking. This is made

possible by numerous electives in soils, crops, agricultural economics, animal husbandry, veterinary medicine, dairy husbandry, horticulture, milling, and poultry.

STATE TEACHERS' CERTIFICATES

By the selection of proper electives in the department of education, the four-year curriculum in agriculture may not only lead to the degree of bachelor of science in agriculture, but at the same time qualify the student for the three-year Kansas state teachers' certificate, renewable for life and valid in any high school or any other public school in the State. A student desiring to qualify for teaching should begin his professional preparation by electing psychology, first semester, junior year. A total of eighteen semester credits in the department of education is required for this certificate. These must include the following courses: psychology, educational administration, and educational psychology or educational sociology.

STATE CERTIFICATES FOR TEACHERS OF VOCATIONAL AGRICULTURE

The forty-three semester hours of electives provided in this curriculum in agriculture may be so chosen as thoroughly to prepare the student for the teaching of vocational agriculture in schools participating in the federal Smith-Hughes funds. The following are the electives suggested for those preparing to be supervisors or teachers of vocational agriculture:

	<i>Semester credits.</i>
Professional work in education	18
Psychology	3
Educational Administration	3
Educational Psychology, or Educational Sociology	3
Methods of Teaching Agriculture	3
Agricultural Education	2
Electives in Education	4
Farm Management	3
Soil Management	2
Market Gardening, or Farm Animals in Health and in Disease	3
Rural Architecture	3
Agricultural Economics	3
Tractors and Trucks, or Farm Motors	3
Field Machinery	2
Woodwork	2
Forging	2
Concrete Construction	2
Total	43

Candidates for the certificate in vocational agriculture must also have had not less than two full years of actual farm experience in labor or management, at least one of which shall have been continuous so as to give practical contact with farm conditions during all seasons.

THE CURRICULUM IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the livestock on the farms, and with the advance of livestock in value, there is constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases

common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as to render them suitable for human food. The public is now demanding that milk and other food products be free from contamination and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The curriculum in veterinary medicine at the Agricultural College was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this curriculum is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook. Better to fit the veterinarian to deal wisely with the livestock problems which he has to meet, he is required to take the work in livestock feeding, breeding and judging, and in milk inspection, zoölogy, and embryology, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

THE CURRICULUM IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

The combined curriculum in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Curriculum in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Chemistry I	Chemistry II
Chem. 101 5(3-6)	Chem. 102 5(3-6)
General Botany I	General Botany II
Bot. 101 3(1-4, 2)	Bot. 104 3(1-4, 2)
Market Grades and Classes of Livestock	Plant Propagation
An. Husb. 101..... 3(1-6)	Hort. 101 3(2-2, 1)
Dairy Judging	Elements of Dairying
Dairy Husb. 104..... 1(0-3)	Dairy Husb. 101..... 3(2-3)
Military Science I	Military Science II
Mil. Tr. 101..... 1(0-3)	Mil. Tr. 102..... 1(0-3)
Physical Education M-I	Physical Education M-II
Phys. Ed. 103..... (0-2)	Phys. Ed. 104..... (0-2)
Library Methods	
Lib. Ec. 101..... 1(1-0)	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry	Quantitative Analysis I
Chem. 120 3(2-2, 1)	Chem. 150 2(0-6)
Agricultural Physics	Principles of Feeding
Physics 111 3(3-0)	An. Husb. 104 3(3-0)
Anatomy and Physiology	General Zoölogy
Vet. 205 5(5-0)	Zoöl. 105 5(3-6)
Grain Crop Production	Forage Crop Production
Agron. 101 3(2-2, 1)	Agron. 102 3(2-2, 1)
Plant Pathology I	Farm Poultry Production
Bot. 107 3(1-4, 2)	Poult. Husb. 101 2(1-2, 1)
	Orcharding
	Hort. 107 2(1-2, 1)
Military Science III	Military Science IV
Mil. Tr. 103 1(0-3)	Mil. Tr. 104 1(0-3)
Physical Education M-III	Physical Education M-IV
Phys. Ed. 105 (0-2)	Phys. Ed. 106 (0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Genetics	Soil Fertility
An. Husb. 106 3(3-0)	Agron. 132 3(2-2, 1)
Soils	Agricultural Journalism
Agron. 131 4(3-3)	Ind. Jour. 121 1(1-0)
Agricultural Microbiology	General Entomology
Bact. 106 3(1-6)	Ent. 101 3(2-3)
Electives* 6	Electives* 9

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Agricultural English†	Agricultural Relationships†
Engl. 137 3(3-0)	Ag. Ec. 213 1(1-0)
Major electives‡ 6	Major electives‡ 6
Minor electives§ 4	Minor electives§ 5
Free electives§§ 3	Free electives§§ 4

* Six semester credit hours of junior electives must be chosen from the work offered in history, economics, education, modern languages, or mathematics. Students preparing to teach should take not less than eleven semester credit hours of junior electives in the Department of Education.

† The courses in Agricultural English and Agricultural Relationships are open to seniors only.

‡ Major electives must be chosen from one department in the Division of Agriculture and approved by the head of the department.

§ Minor electives may be chosen from more than one department. They must be agricultural courses, or closely related science, and they must support the major work.

§§ Students preparing to teach must use senior free electives in completing their requirements for the state teachers' certificate.

ADAPTATION CURRICULA FOR THE CLASSES OF 1920, 1921, AND 1922

The classes of 1921 and 1922 are required to complete the work as provided in this curriculum, except that those who have already earned credit in Composition and Literature I and II will not be held for the course in Agricultural English otherwise required in the first semester, senior year.

The class of 1920 is required to complete the sophomore and junior years as provided in the curriculum given in the catalogues for 1916-1917 and 1917-1918, except that Qualitative Analysis (8 semester credits) is to take the place of Plant Pathology first semester, sophomore year; and Library Methods is to be added to the work of the first or of the second semester, sophomore year. The work of the senior year is outlined above, except that six free electives are required in the first semester, and Agricultural English may be included in these electives.

Agricultural Electives for Students in the Curriculum in Agriculture

AGRICULTURAL ECONOMICS

FIRST SEMESTER	SECOND SEMESTER
Farm Cost Accounting 2(1-3)	Agricultural Economics 3(3-0)
	Marketing and Coöperation 2(2-0)
	Advanced Farm Management 3(1-6)
	Agricultural Industries 2(2-0)
	Agricultural Land Problems 1(1-0)
	Farm Management 3(2-3)
	(Each semester)
	Research in Agricultural Economics (2 to 6 semester credits)
	Research in Farm Management (1 to 5 semester credits)
	(Each semester, for graduates)

AGRONOMY

FIRST SEMESTER	SECOND SEMESTER
Seed Identification and Weed Control 2(1-3)	Crop Improvement 3(2-3)
Advanced Forage Crops 2(1-3)	Advanced Grain Crops 2(1-3)
Advanced Soil Fertility 2(1-3)	Special Crops 1(1-0)
	Dry-land Farming 2(2-0)
Soil Management 2(1-3)	Advanced Soils Laboratory 2(0-6)
Principles of Agronomic Experimentation 1(1-0)	Soil Survey 2(1-3)
	Agronomy Seminar 1(1-0)
	Crops Research (1 to 5 semester credits)
	(Each semester, for graduates)
	Soils Research (1 to 5 semester credits)
	(Each semester, for graduates)

ANIMAL HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER—Continued.
History of Breeds and Pedigrees 3(2-3)	Advanced Feeding 2(2-0)
Pork Production 3(2-3)	Livestock Marketing 2(2-0)
Mutton Production 3(2-3)	Animal Husbandry Seminar 2(2-0)
Advanced Stock Judging I 2(0-6)	Animal Breeding 4(3-3)
Genetics Seminar (2 to 5 semester credits)	Advanced Genetics 4(3-3)
	Advanced Studies in Pedigrees 3(1-6)
	Systems of Livestock Production 3(3-0)
	Advanced Meats (2 to 4 semester credits)
	The Wool Industry 3(2-3)
SECOND SEMESTER	
Beef Production 3(2-3)	
Advanced Stock Judging II 2(0-6)	
Horse Production 3(2-3)	

Judging Breeding Types and Classes of Livestock

2 (0-6)

(Each semester)

Meats

2 (1-3)

(Each semester)

Research in Genetics

(2 to 5 semester credits)

(Each semester)

Teachers' Course in Animal Husbandry

(4 semester credits, Summer School.)

DAIRY HUSBANDRY

FIRST SEMESTER

Butter Making and Creamery Management

3 (2-3)

Market Milk

2 (1-3)

SECOND SEMESTER

Dairy Inspection I

2 (1-3)

Milk Production

3 (3-0)

Cheese and Ice Cream Making

3 (2-3)

Advanced Dairy Judging

1 (0-3)

Dairy Seminar

1 (1-0)

Dairy Research

(3 semester credits)

(Each semester, for graduates)

HORTICULTURE

FIRST SEMESTER

Systematic Pomology

3 (1-6)

Farm Forestry

4 (3-3)

Practical Pomology

3 (2-3)

Spraying

2 (1-3)

SECOND SEMESTER

Small Fruits

2 (2-0)

Dendrology

3 (1-6)

Silviculture

3 (2-3)

Orchard Management

4 (3-3)

Market Gardening

3 (2-3)

Landscape Gardening I

4 (2-6)

School Gardening

3 (2-3)

Plant Materials in Landscape Gardening

3 (2-3)

Greenhouse Construction and Management

3 (3-0)

Landscape Gardening II

3 (0-9)

History and Literature of Landscape

Gardening 2 (2-0)

Tree Surgery

2 (1-3)

The Theory and Aesthetics of Landscape

Gardening 3 (2-3)

City and Town Planting

3 (1-6)

MILLING INDUSTRY

FIRST SEMESTER

Grain Marketing

3 (3-0)

Wheat and Flour Testing

4 (1-9)

SECOND SEMESTER

Principles of Milling

1 (0-3)

Grain Products

2 (2-0)

Milling Practice I

3 (1-6)

Milling Practice II

2 (0-6)

Experimental Baking A

2 (0-6)

POULTRY HUSBANDRY

FIRST SEMESTER	SECOND SEMESTER
Practice in Poultry Feeding (1 semester credit)	Practice in Incubation (1 or 2 semester credits)
	Practice in Brooding (1 to 3 semester credits)
Practice in Milk Feeding (1 semester credit)	
Poultry Breeds and Types 2(1-3)	Advanced Poultry Judging 1(0-3)
Market Poultry 2(1-3) or 3(1-6)	Poultry Breeding 2(0-6)
	Poultry Farm Management 3(2-3)
	Poultry Bacteriology 3(1-6)
	Comparative Anatomy of Domestic Birds 3(1-6)
Poultry Research (2 to 4 semester credits)	

VETERINARY MEDICINE

FIRST SEMESTER	SECOND SEMESTER
Anatomy I 6(3-9)	Anatomy II 7(3-12)
Anatomy III 5(1-12)	Anatomy IV 3(1-6)
Histology I 3(1-6)	Histology II 3(1-6)
	Farm Animals in Health and in Disease 3(2-3)
	Obstetrics 3(3-0)
	Horseshoeing 1(1-0)

List of Electives for Agricultural Students, With
Their Prerequisites

Subject	Prerequisites
AGRICULTURAL ECONOMICS:	
Agricultural Economics	Principles of Feeding, Grain Crop Production, Forage Crop Production, and Soil Fertility
Farm Management	Principles of Feeding, Grain Crop Production, Forage Crop Production, and Soil Fertility
Farm Cost Accounting	None
Marketing and Coöperation	Agricultural Economics
Advanced Farm Management	Farm Management
Agricultural Industries	Agricultural Economics or Farm Management
Agricultural Land Problems.....	Agricultural Economics
Research in Agricultural Economics...	Agricultural Economics
Research in Farm Management.....	Farm Management, and Farm Cost Accounting
AGRONOMY:	
Advanced Grain Crops.....	Grain Crop Production
Advanced Forage Crops.....	Forage Crop Production
Seed Identification and Weed Control..	Grain Crop Production, and Forage Crop Production
Crop Improvement	Grain Crop Production, Forage Crop Production, and Genetics
Special Crops	Grain Crop Production, and Forage Crop Production
Dry-land Farming	Soils
Advanced Soils Laboratory.....	Soils
Soil Survey	Soils

ELECTIVES—AGRONOMY—continued.

<i>Subject</i>	<i>Prerequisites</i>
Advanced Soil Fertility.....	Soil Fertility
Soil Management	Soil Fertility
Principles of Agronomic Experimentation, Crops Research	Crop Improvement and Soil Fertility
Soils Research	Advanced Grain Crops, and Advanced Forage Crops
Agronomy Seminar	Soil Fertility, and Elementary Organic Chemistry
	Grain Crop Production, Forage Crop Production, and Soils
ANIMAL HUSBANDRY:	
Judging Breeding Types and Classes of Livestock	Market Grades and Classes of Livestock
Genetics	General Zoölogy, and General Botany II
History of Breeds and Pedigrees.....	Judging Breeding Types and Classes of Livestock
Pork Production	Market Grades and Classes of Livestock, and Principles of Feeding
Mutton Production	Market Grades and Classes of Livestock, and Principles of Feeding
Advanced Stock Judging I.....	Judging Breeding Types and Classes of Livestock
Advanced Stock Judging II.....	Advanced Stock Judging I
Meats	Market Grades and Classes of Livestock, and Principles of Feeding
Beef Production	Market Grades and Classes of Livestock, and Principles of Feeding
Horse Production	Market Grades and Classes of Livestock, and Principles of Feeding
Form and Function	Advanced Stock Judging II, and Extempore Speech I
Teachers' Course in Animal Husbandry, Advanced Feeding	None
Livestock Marketing	Principles of Feeding
	Pork Production, Mutton Production, Beef Production, and Horse Production
Animal Husbandry Seminar	Principles of Feeding
Animal Breeding	Genetics
Advanced Genetics	Animal Breeding
Genetics Seminar	Advanced Genetics
Research in Genetics.....	Advanced Genetics
Advanced Studies in Pedigrees	History of Breeds and Pedigrees
Systems of Livestock Production.....	Pork Production, Mutton Production, Beef Production, and Horse Production
Advanced Meats	Meats
The Wool Industry.....	Mutton Production
APPLIED MECHANICS:	
Engineering Drawing	None
Descriptive Geometry	General Drawing
BACTERIOLOGY:	
Soil Microbiology	Agricultural Microbiology
Dairy Bacteriology	Agricultural Microbiology
Poultry Bacteriology	Agricultural Microbiology
BOTANY:	
Plant physiology I.....	General Botany II
Taxonomic Botany	General Botany II
Field Crops and Vegetable Diseases.....	Plant Pathology I
Fruit Crop Diseases.....	Plant Pathology I
Economic Botany	General Botany II
Plant Pathology II.....	Plant Pathology I
Plant Pathology III.....	Plant Pathology II
CHEMISTRY:	
Advanced Inorganic Chemistry.....	Chemistry II
Inorganic Preparations	Chemistry II
Organic Chemistry I.....	Chemistry II
Organic Chemistry II.....	Organic Chemistry I
Organic Preparations	Organic Chemistry II
Principles of Animal Nutrition.....	Organic Chemistry
Physiological Chemistry	Organic Chemistry
Physical Chemistry	Quantitative Analysis
Quantitative Analysis II.....	Chemistry II
Quantitative Analysis III.....	Quantitative Analysis II
Chemistry of Soils and Fertilizers....	Quantitative Analysis I
Chemistry of Plant Products.....	Quantitative Analysis I, Organic Chemistry

ELECTIVES—CHEMISTRY—continued

<i>Subject</i>	<i>Prerequisites</i>
Chemistry of Dairy Products.....	Quantitative Analysis I, Organic Chemistry
Chemistry of Meats.....	Quantitative Analysis I, Organic Chemistry
Research in Agricultural Chemistry....	(Depends upon work undertaken)
CIVIL ENGINEERING:	
Surveying I	Trigonometry
Surveying II	Surveying I
Elements of Irrigation and Drainage...	None
DAIRY HUSBANDRY:	
Advanced Dairy Judging.....	Dairy Judging
Dairy Inspection I.....	Elements of Dairying, Microbiology, and Dairy Chemistry
Milk Production	Elements of Dairying, Principles of Feeding
Butter Making and Creamery Management	Elements of Dairying, Dairy Bacteriology
Market Milk	Elements of Dairying, Dairy Bacteriology
Cheese and Ice Cream Making.....	Elements of Dairying, Dairy Bacteriology, and Dairy Chemistry
Dairy Seminar	Dairy Inspection I, Milk Production
Dairy Research	Milk Production, Butter Making and Creamery Management
ECONOMICS AND SOCIOLOGY:	
Economics	None
Sociology	None
Rural Sociology	None
Business Organization	Economics
Labor Problems	Economics
Money and Banking	Economics
Public Finance	Economics
Economic Geography	Economics
Business Management	Economics
Current Economic Problems	Economics
Social Problems	Sociology or Economics
Community Problems	Sociology or Economics
EDUCATION:	
Psychology	None
Educational Administration	None
Educational Psychology	Psychology
Educational Sociology	None
Agricultural Education	Educational Administration
Special Methods in the Teaching of Agriculture	Educational Psychology or Educational Sociology
Rural Education.....	Educational Administration
History of Education	None
Supervised Observation and Teaching in Agriculture	Educational Psychology or Educational Sociology
ELECTRICAL ENGINEERING:	
Electrical Engineering C	College Physics
Illuminating Engineering	College Physics
ENGLISH:	
Advanced Composition I.....	College Rhetoric II
Argumentation and Debate	College Rhetoric II
Business English	College Rhetoric II
Advertising English	College Rhetoric II
Oral English I	College Rhetoric II
Methods of Teaching English.....	College Rhetoric II
Farm Advertising	College Rhetoric II
Farm Bulletins	College Rhetoric II
ENTOMOLOGY:	
Apiculture	General Entomology
Milling Entomology	General Entomology
Horticultural Entomology	General Entomology
General Economic Entomology	General Entomology
Advanced General Entomology.....	General Entomology
Insect Morphology I	General Entomology
Taxonomy of Insects I	General Entomology, Insect Morphology I
Principles of Taxonomy.....	(Must be taken with Taxonomy of Insects I)
Medical Entomology	General Entomology

ELECTIVES—*continued*

<i>Subject</i>	<i>Prerequisites</i>
FARM ENGINEERING:	
Rural Architecture	None
Field Machinery	None
Tractors and Trucks	None
Farm Motors	None
Power Machinery	Field Machinery
Advanced Farm Machinery	Power Machinery
Farm Machinery Research	Power Machinery
Farm Equipment	None
Farm Sanitation and Water Supply	None
FRENCH:	
French I	None
French II	French I
French Readings	French II
French Short Stories	French Readings
GERMAN:	
German I	None
German II	German I
German Readings	German II
German Comedies	German Readings
German Short Stories	German Readings
Scientific German I	German Readings
Scientific German II	Scientific German I
HISTORY AND CIVICS:	
American History I	None
American History II	None
American History III	None
American Agricultural History	None
American Industrial History	None
American Political History	None
Pan-America	None
Modern Europe	None
European Industrial History	None
History of British Agriculture	None
Current History	None
American Government	None
Comparative Government	None
Business Law I	None
Business Law II	Business Law I
Farm Law	None
HORTICULTURE:	
Systematic Pomology	None
Small Fruits	Plant Propagation
Farm Forestry	None
Dendrology	None
Silviculture	Farm Forestry or Dendrology
Practical Pomology	Systematic Pomology
Orchard Management	None
Spraying	Chemistry II
Market Gardening	None
School Gardening	None
Greenhouse Construction and Management	None
Landscape Gardening I	None
Landscape Gardening II	Landscape Gardening I
History and Literature of Landscape Gardening	None
Plant Materials of Landscape Gardening	Plant Propagation
Theory and Aesthetics of Landscape Gardening	History and Literature of Landscape Gardening
Tree Surgery	Plant Physiology II
City and Town Planting	None
INDUSTRIAL JOURNALISM:	
Elementary Journalism	None
Industrial Writing	Elementary Journalism or Agricultural Journalism
Industrial Feature Writing	Industrial Writing
Journalism Practice I	May be taken with Agricultural Journalism
Journalism Practice II	Journalism Practice I

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ELECTIVES—continued

<i>Subject</i>	<i>Prerequisites</i>
MATHEMATICS:	
Plane Trigonometry	Plane Geometry
College Algebra	Plane Trigonometry
Analysis of Statistics	None
MILLING INDUSTRY:	
Principles of Milling.....	None
Grain Marketing	Grain Crop Production
Grain Products	Grain Marketing
Milling Practice I.....	Principles of Milling
Milling Practice II.....	Milling Practice I
Wheat and Flour Testing	Grain Products, Organic Chemistry, and Advanced Quantitative Analysis
Experimental Baking A.....	Wheat and Flour Testing
PHYSICS:	
General Physics I.....	Trigonometry
General Physics II.....	General Physics I
Photography	None
POULTRY HUSBANDRY:	
Practice in Poultry Feeding	Farm Poultry Production
Practice in Incubation	Farm Poultry Production
Practice in Brooding	Farm Poultry Production
Practice in Milk Feeding	Farm Poultry Production
Poultry Breeds and Types.....	None
Advanced Poultry Judging.....	Poultry Breeds and Types
Market Poultry	Farm Poultry Production
Poultry Breeding	Genetics
Poultry Farm Management	Farm Management
Poultry Bacteriology	Microbiology
Comparative Anatomy of Domestic Birds,	Embryology
Poultry Research	Farm Poultry Production, Practice in Poul- try Feeding, Practice in Incubation, and Practice in Brooding
SHOP PRACTICE:	
Woodwork I.....	None
Woodwork II.....	Woodwork I
Woodwork III.....	Woodwork II
Woodworking for Grammar Grades....	None
Woodworking I for High Schools....	Woodworking for Grammar Grades
Woodworking II for High Schools....	Woodworking I for High Schools
Wood Turning	Woodworking II for High Schools
Farm Shop Practice	None
Farm Woodwork	None
Foundry Practice	None
Pattern Making	Foundry Practice
Machine Tool Work I.....	Foundry Practice
Machine Tool Work II.....	Machine Tool Work I
Forging I.....	None
Forging II.....	Forging I
Forging III.....	Forging II
Forging IV.....	Forging III
SPANISH:	
Spanish I	None
Spanish II	Spanish I
Spanish Readings	Spanish II
STEAM AND GAS ENGINES:	
Dairy Refrigeration	None
VETERINARY MEDICINE:	
Farm Animals in Health and in Disease,	Anatomy and Physiology
Anatomy I	None
Anatomy II	Anatomy I
Anatomy III	Anatomy II
Anatomy IV	Anatomy III
Comparative Physiology I.....	Organic Chemistry
Comparative Physiology II.....	Comparative Physiology I
Histology I	None
Histology II	Histology I
Horseshoeing	Anatomy and Physiology
Obstetrics	Anatomy and Physiology, and General Embryology

ELECTIVES—continued

<i>Subject</i>	<i>Prerequisites</i>
ZOOLOGY:	
General Embryology	General Zoölogy
Advanced Zoölogy I.....	General Zoölogy
Advanced Zoölogy II.....	General Zoölogy
Invertebrate Taxonomy	General Zoölogy
Vertebrate Taxonomy	General Zoölogy
Animal Ecology	General Zoölogy, General Entomology
Cytology	Embryology
Evolution and Heredity.....	Embryology
Dynamic Geology	None
Historical Geology	Dynamic Geology

Curriculum in Veterinary Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Anatomy I Vet. 201 6(3-9)	Anatomy II Vet. 202 7(3-12)
Histology I Vet. 221 3(1-6)	Histology II Vet. 222 3(1-6)
Chemistry A-V-I Chem. 105 5(3-4, 2)	Chemistry V-II Chem. 106 5(3-6)
General Zoölogy Vet. Zoöl. 111 3(2-3)	Embryology Vet. Zoöl. 114 2(1-3)
Military Science I Mil. Tr. 101..... 1(0-3)	Military Science II Mil. Tr. 102..... 1(0-3)
Physical Education M-I Phys. Ed. 103..... (0-2)	Physical Education M-II Phys. Ed. 104..... (0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Anatomy III Vet. 203 5(1-12)	Anatomy IV Vet. 204 3(1-6)
Comparative Physiology I Vet. 211 5(4-3)	Comparative Physiology II Vet. 212 3(2-3)
Medical Botany Bot. 113 2(1-3)	Pathogenic Bacteriology I Bac. 111 4(2-6)
College Rhetoric I Engl. 101 3(3-0)	Materia Medica I Vet. 131 2(2-0)
Types and Classes of Livestock Vet. An. Husb. 102..... 3(1-6)	Principles of Feeding An. Husb. 104..... 3(3-0)
	Genetics An. Husb. 106..... 3(3-0)
Military Science III Mil. Tr. 103..... 1(0-3)	Military Science IV Mil. Tr. 104..... 1(0-3)
Physical Education M-III Phys. Ed. 105..... (0-2)	Physical Education M-IV Phys. Ed. 106..... (0-2)

* ADJUSTMENT CURRICULUM FOR THE CLASS OF 1920

The class of 1920 will be required to complete the sophomore, junior, and senior years as provided in this curriculum, except that Types and Classes of Livestock, Vet., first semester, sophomore year, is to be omitted; Histology (2 semester credits) and Organic Chemistry (3 semester credits) are to be added to this semester's work. The required work of the freshman year is outlined in the catalogue for 1915-16.

JUNIOR

FIRST SEMESTER		SECOND SEMESTER	
Surgery I		Surgery II	
Vet. 151	3(3-0)	Vet. 152	3(3-0)
Diagnosis		Medicine I	
Vet. 161	2(2-0)	Vet. 162	4(4-0)
Materia Medica II		Horseshoeing	
Vet. 132	2(2-0)	Vet. 156	1(1-0)
Pharmacy		Therapeutics	
Vet. 134	1(0-3)	Vet. 133	3(3-0)
Pathology I		Pathology II	
Vet. 241	5(4-3)	Vet. 242	6(4-6)
Pathogenic Bacteriology II		Clinics II	
Bac. 116	4(2-6)	Vet. 172	3(0-9)
Clinics I			
Vet. 171	3(0-9)		

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
Surgery III		Surgery IV	
Vet. 153	3(3-0)	Vet. 154	3(3-0)
Medicine II		Medicine III	
Vet. 163	5(5-0)	Vet. 164	5(5-0)
Pathology III		Ophthalmology	
Vet. 243	3(2-3)	Vet. 165	1(1-0)
Meat Inspection		Operative Surgery	
Vet. 246	2(2-0)	Vet. 155	1(0-3)
Parasitology		Jurisprudence	
Zoöl. 123	2(1-3)	Vet. 166	1(1-0)
Clinics III		Obstetrics	
Vet. 173	4(0-12)	Vet. 157	3(3-0)
		Dairy Inspection II	
		Dairy Husb. 118.....	1(0-3)
		Clinics IV	
		Vet. 174	4(0-12)

Curriculum in Animal Husbandry and Veterinary
Medicine*

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

Freshman year of the Curriculum in Agriculture

SOPHOMORE

FIRST SEMESTER		SECOND SEMESTER	
Organic Chemistry		Quantitative Analysis I	
Chem. 120	3(2-2, 1)	Chem. 150	2(0-6)
General Zoölogy		Pathogenic Bacteriology I	
Zoöl. 105	5(3-6)	Bac. 111	4(2-6)
Anatomy I		Anatomy II	
Vet. 201	6(3-9)	Vet. 202	7(3-12)
Grain Crop Production		Forage Crop Production	
Agron. 101	3(2-2, 1)	Agron. 102	3(2-2, 1)
		Agricultural Journalism	
		Ind. Jour. 121.....	1(1-0)
Military Science III		Military Science IV	
Mil. Tr. 103.....	1(0-3)	Mil. Tr. 104.....	1(0-3)
Physical Education M-III		Physical Education M-IV	
Phys. Ed. 105.....	(0-2)	Phys. Ed. 106.....	(0-2)

* This curriculum is so arranged that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two more years.

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
General Embryology	Principles of Feeding
Zoöl. 117 3(2-3)	An. Husb. 104..... 3(3-0)
Anatomy III	Anatomy IV
Vet. 203 5(1-12)	Vet. 204 3(1-6)
Histology I	Histology II
Vet. 221 3(1-6)	Vet. 222 3(1-6)
General Entomology	Electives† 7
Ent. 101 3(2-3)	
Electives† 3	

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Genetics	Agricultural Relationships
An. Husb. 106..... 3(3-0)	Ag. Ec. 213..... 1(1-0)
Comparative Physiology I	Soil Fertility
Vet. 211 5(4-3)	Agron. 132 3(2-2, 1)
Soils	Comparative Physiology II
Agron. 131 4(3-3)	Vet. 212 3(2-3)
Agricultural English	Materia Medica I
Engl. 137 3(3-0)	Vet. 131 2(2-0)
Electives 1	Electives 7

FIFTH YEAR

Junior year of the Curriculum in Veterinary Medicine.

SIXTH YEAR

Senior year of the Curriculum in Veterinary Medicine.

Collections for Supplies or Materials Used in the Courses in Division of Agriculture

Department	Course	Semester charge
AGRONOMY:		
	Grain Crop Production.....	\$1.50
	Forage Crop Production.....	2.00
	Farm Crops	1.50
	Crop Improvement	1.00
	Advanced Forage Crops.....	1.00
	Advanced Grain Crops	1.00
	Crop Research	2.50
	Soils	2.00
	Soil Fertility	2.00
	Dry-land Farming	2.50
	Soils Research	3.50
	Farm Management	1.00
	Cost Accounting	1.00
ANIMAL HUSBANDRY:		
	Meats	2.50
DAIRY HUSBANDRY:		
	Elements of Dairying	2.00
	Butter Making and Creamery Management.....	2.00
	Market Milk	1.00
	Dairy Inspection I.....	1.00
	Dairy Inspection II.....	1.00
HORTICULTURE:		
	Plant Propagation .....	.50
	Systematic Pomology	1.00
	Spraying	1.00

† Six semester credit hours of junior electives must be chosen from the work offered by the departments of history, economics, education, modern languages, or mathematics.

Department	Course	Semester charge
MILLING INDUSTRY:		
	Wheat and Flour Testing.....	5.00
	Experimental Baking A.....	2.00
	Experimental Baking H.....	2.00
	Principles of Milling.....	1.00
	Milling Practice I.....	1.00
	Milling Practice II.....	1.00
VETERINARY MEDICINE:		
	Histology I	2.50
	Histology II	2.50
	Pathology I	2.50
	Pathology II	2.50
	Pathology III	2.00
	Pharmacy	2.00
	Operative Surgery	5.00
	Anatomy I	5.00
	Anatomy II	5.00
	Anatomy III	5.00
	Anatomy IV	5.00
	Anatomy and Physiology .....	.50
	Physiology I	3.00
	Physiology II	3.00
	Experimental and Practical Physiology	2.00

Agricultural Economics

Professor MACKLIN
Assistant Professor GRIMES

The realization of a more profitable agriculture depends as much upon the utilization of sound business principles, management and methods as upon the practice of technical knowledge emphasized in other departments of an agricultural college. The business side of farming deals essentially with two important groups of forces and conditions, which may be classified, on the one hand, as those centering about the individual and his particular farm, while on the other hand are those having to do largely with group activities and relationships operating from within the locality as well as from outside regions. Local, State, and federal governments in their relations to farmers, middlemen and consumers have a definite part in programs of modern agriculture. The farmer makes relatively large or small profits according to the degree of his personal efficiency in the organization and management of the farm and the marketing of its products. The courses in this department are therefore designed to equip the student with principles and facts, and the habits of clear thinking which will lead to more efficient and profitable farming both for the individual and for the community.

The Department engages not only in teaching, but also conducts investigations of the various economic problems of agriculture. A number of studies have been completed, others are being conducted, and many more are contemplated for the future. These studies provide ample material for class work and present opportunities for advanced students to engage in original investigation and research. Farm credit, tenancy, the marketing of farm products, and other subjects, together with special farm-management investigations, center the student's attention on facts which are up-to-date and of vital importance to those who desire to make their farming profitable and interesting.

Farm-management studies have been made in many parts of the State, and are being extended each year. These studies of the farm business furnish abundant material for class and laboratory work, and give an excellent knowledge of the business problems of individual farmers in the various parts of the State. A number of the more successful farms of the State are visited by the students in the advanced courses in farm management. These farms furnish the student an opportunity to study the personality of the farmer as well as his business methods and results.

COURSES IN AGRICULTURAL ECONOMICS

FOR UNDERGRADUATES

101.* AGRICULTURAL ECONOMICS. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: An. Husb. 104, and Agron. 101, 102, and 132. In case student desires, Agricultural Economics may be taken along with Agron. 132. Professor Macklin.

Clear thought and sound judgment upon the problems that confront the individual are essential to success in any phase of agricultural production. The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth. The course is conducted by lectures, texts, and supplementary reading. Texts: Taylor's *Agricultural Economics* and Ely and Wicker's *Elementary Principles of Economics*.

106. FARM MANAGEMENT. Elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101, 102, and 132, and An. Husb. 104. Assistant Professor Grimes.

Farming is studied as a business, taking up the factors which affect its success and methods of improving it to obtain the most efficient organization. Methods of leasing are also studied.

111. FARM COST ACCOUNTING. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Assistant Professor Grimes.

Various systems of farm records and accounts are studied to acquaint the student with the more practical methods.

FOR GRADUATES AND UNDERGRADUATES

201. MARKETING AND COÖPERATION. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101. Professor Macklin.

American farmers' organizations have attempted much in the way of reorganizing the process by which agricultural products are transferred from the farm to the consumer as well as in the bettering of farmers as a class. Knowledge of their experience in coöperative undertakings, whether in the line of marketing or production, is essential to a thorough understanding of the situation regarding farmers' coöperative organizations and the problems of greater economy in marketing. Following the sketch of the important farmer movements, speculation, market organization, coöperative production, exchange and credit are studied in detail. The course consists of lectures, special topics, assigned readings, and discussions. Text: Weld's *The Marketing of Farm Products*.

* For an explanation of the system used in numbering courses, see the paragraph on "Course Numbers," given elsewhere in this catalogue.

206. **ADVANCED FARM MANAGEMENT.** Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Ag. Ec. 106. Assistant Professor Grimes.

The factors limiting profits in farming in various regions are studied. A number of well-managed farms are visited and studied.

211. **AGRICULTURAL INDUSTRIES.** Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Ag. Ec. 101 or 106. Dean Farrell.

This course deals with some of the more important phases of agriculture from the standpoint of their industrial requirements and relationships. Consideration is given to the principal geographic, economic, and social factors involved in the establishment and maintenance of the world's leading agricultural industries. The course is designed primarily to fit students to make an agricultural reconnaissance either in a settled or unsettled region; to determine what agricultural industries are suitable for a region; and to devise methods of establishing new agricultural industries or of improving industries already established. The course consists of lectures, reference work, assigned topics, and discussions.

213. **AGRICULTURAL RELATIONSHIPS.** Senior year, second semester. Class work, one hour. One semester credit. Required of all seniors in agriculture, and open to them and to graduates only. Dean Farrell.

This course is designed for agricultural students who are about to enter upon their life work. It is given for the purpose of directing the attention of these students to their duties, responsibilities and opportunities for service as citizens of the agricultural community and as specialists in various phases of agricultural activity. It consists of lectures and discussions relating to the broad, fundamental relationships of individual farmers and other agricultural people with each other, and of the agricultural community with other communities. The course places special emphasis in this connection on the responsibilities, obligations, and opportunities of agricultural graduates as American citizens.

216. **AGRICULTURAL LAND PROBLEMS.** Elective, second semester. Class work, one hour. One semester credit. Prerequisite: Ag. Ec. 101. Professor Macklin.

The practical exhaustion of free land, rising prices, increasing tenancy and declining soil fertility have produced unusual interest in land problems. The conditions essential to the best productive use of land, together with the various attempts in different countries to promote the proper use of land by various land policies, provide the basis for the development of helpful views respecting land reforms which are now pressing for public recognition. The course consists of lectures, reference work, assigned topics, and discussions.

FOR GRADUATES.

301. **RESEARCH IN AGRICULTURAL ECONOMICS.** Elective, both semesters. Credit to be based on the quality and quantity of the work accomplished. Prerequisite: Ag. Ec. 101. Professor Macklin.

This course is open only to a limited number of advanced students. A study is made of the economic problems of immediate interest to the farmers of Kansas. The facts and the processes of present marketing systems must be known before intelligent changes in them can be suggested. The forces causing undesirable tenancy must be determined before the evils can be eradicated. These subjects and many others are topics for careful research in this course.

306. **RESEARCH IN FARM MANAGEMENT.** Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits. Prerequisites: Ag. Ec. 106 and 111. Assistant Professor Grimes.

Students are assigned special farm-management problems. The completion of the work entitles them to credit according to the amount of work done.

Agronomy

Professor CALL	Assistant Professor MULLEN
Professor SALMON	Assistant WILSON
Professor THROCKMORTON	Assistant HARLING
Assistant Professor PARKER	Assistant PHINNEY
Assistant Professor CUNNINGHAM	Fellow TUTTLE
Assistant Professor SEWELL	

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops, and for conducting experiments in soil fertility and methods of culture, afford the student excellent opportunities for study and investigation.

Large and well-equipped laboratories for soil and crop work are maintained for the regular use of students. Material is provided for the study of the grain and forage crops best adapted to different purposes and most suitable for growing in the State. Ample greenhouse space is provided for germinating seeds under varying conditions, and for research work in soils during the winter months.

The Department of Agronomy offers courses in cereal and forage crop production and improvement, in soils, soil fertility, soil survey, and dry-land farming.

The following detailed description of courses will give a definite understanding of each subject given, its position in the curriculum, and the proportion of time devoted to class and to laboratory work.

COURSES IN FARM CROPS

FOR UNDERGRADUATES

101. GRAIN CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Assistant Professor Mullen.

This course is a study of the distribution, relative importance, and production of grain crops, including wheat, corn, oats, barley, rye, rice, buckwheat, and flax.

102. FORAGE CROP PRODUCTION. Sophomore year, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Assistant Professor Mullen.

This course is a study of the distribution, relative importance, value, and production of forage crops, including sorghums, alfalfa, clover, and the grasses.

103. FARM CROPS. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Assistant Professor Mullen.

This course consists of a study of the more important grain and forage crops, especially from the production viewpoint.

105. SEED IDENTIFICATION AND WEED CONTROL. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Agron. 101 and 102. Mrs. Harling.

Methods of propagation, control, and eradication of weeds are discussed in lecture. The laboratory period is devoted to the identification of weed plants, and seeds; to germination and purity testing; and to field trips.

FOR GRADUATES AND UNDERGRADUATES

201. CROP IMPROVEMENT. Junior year and elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Agron. 101 and 102, and An. Husb. 106. Assistant Professor Parker.

This course reviews the principles of plant breeding and applies them to the principal groups of field crops. Methods of selection, hybridization, and breeding for special qualities are discussed. Laboratory work is a study of heritable characters and of their behavior in several generations following the cross.

202. ADVANCED GRAIN CROPS. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 101. Professor Salmon.

Special phases of grain crop production are discussed in class. The laboratory work is devoted largely to identification and judging of threshed grain.

203. ADVANCED FORAGE CROPS. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 102. Assistant Professor Mullen.

Range and pasture management and improvement are discussed in class. The laboratory work is devoted to grass species and plant ecology in relation to pasture management.

204. SPECIAL CROPS. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101 and 102. Assistant Professor Mullen.

The distribution, climatic and soil requirements, relative importance, and production of sugar beets, cotton, flax for fiber, hemp, tobacco and other minor crops are studied.

205. PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Elective, first semester. Class work, one hour. One semester credit. Prerequisites: Agron. 201 and 132. Professor Salmon.

A discussion of the principles of experimentation in general is followed by their application to agronomic problems. Important contributions to agronomic science are studied from the historical viewpoint.

206. AGRONOMY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Agron. 101, 102, and 131. Professor Call.

In this course students are required to review before the class timely articles appearing in bulletins and current periodicals.

FOR GRADUATES

301. CROPS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits according to the work done. Prerequisites: Agron. 202 and 203. Professor Salmon.

Students choose or are assigned special problems for investigation. The completion of the work entitles them to credit according to the amount of work done.

COURSES IN SOILS

FOR UNDERGRADUATES

131. SOILS. Junior and senior years, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Chem. 102. Professor Call, Professor Throckmorton, and Assistant Professor Sewell.

This course deals with the origin and formation of soils and their classification and composition as influenced by method of formation and climatic condition. Special attention is given to the management of soils required to conserve moisture and liberate plant food.

132. SOIL FERTILITY. Junior and senior years, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 150 and Agron. 131. Professor Call, Professor Throckmorton, and Assistant Professor Sewell.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and management of the soil to conserve its fertility receive most attention in this course.

FOR GRADUATES AND UNDERGRADUATES

231. DRY-LAND FARMING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

The principles underlying the cultivation methods and crop adaptation of dry-land farming are studied.

232. ADVANCED SOIL FERTILITY. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the use of commercial fertilizers and their effects upon plants and soil. A study is also made of sulfonation and toxins.

233. SOIL SURVEY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

Types of soils of the United States and methods of mapping soil areas are studied in this course. Special attention is given to the study of Kansas soils in the field.

234. SOIL MANAGEMENT. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Agron. 132. Professor Throckmorton.

This course deals with the management of soils under irrigation and with the management of wet, sandy and eroded soils and with other types requiring special methods of working.

235. ADVANCED SOILS LABORATORY. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Agron. 131. Professor Throckmorton.

This course deals with the more advanced problems of soil physics and includes the making of mechanical analyses, the determination of moisture equivalent, specific heat, etc.

FOR GRADUATES

331. SOILS RESEARCH. Elective, both semesters and summer school. Laboratory, three to fifteen hours. One to five semester credits, according to the work done. Prerequisites: Agron. 132 and Chem. 150. Professors Call and Throckmorton.

Students are assigned special soil problems. The completion of the work entitles them to credit according to the amount of work done.

Animal Husbandry

Professor McCAMPBELL
Associate Professor BELL
Associate Professor FERRIN
Associate Professor _____

Assistant Professor PATERSON
Assistant Professor WINCHESTER
Instructor _____
Assistant _____

The Department of Animal Husbandry owns 400 acres of land, and rents 256 acres for the maintenance of herds and flocks of purebred horses, cattle, sheep, and hogs. The College livestock has attained a national reputation among the breeders and feeders on account of the many prize-winning animals produced.

The feed yards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feed yard and the animal. He studies the animal from the standpoint of the breeder and of the feeder. He learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are arranged to give the student special instruction in the selection, breeding, feeding, marketing, and management of all classes of livestock. Attention is also given to the sanitary conditions and treatment of the more common forms of disease to which the animals are subject.

COURSES IN ANIMAL HUSBANDRY

FOR UNDERGRADUATES

101. MARKET GRADES AND CLASSES OF LIVESTOCK. Freshman year, first semester. (Also given in second semester and in summer school.) Class work, one hour; laboratory, six hours. Three semester credits. Associate Professor Bell, Associate Professor Ferrin, Assistant Professor Paterson.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes of Livestock*.

Laboratory.—Practice is given in scoring and judging market animals.

102. TYPES AND CLASSES OF LIVESTOCK (VET.). Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor McCampbell.

One-fourth of this course is given by members of the Dairy Husbandry Department. A study is made of the market types and classes of horses, beef cattle, dairy cattle, sheep and swine. Text: Vaughn's *Types and Market Classes of Livestock*.

Laboratory.—Practice is given in scoring and judging market animals.

103. JUDGING BREEDING TYPES AND CLASSES OF LIVESTOCK. Elective, first and second semesters. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 101. Associate Professor Bell, Associate Professor Ferrin, and Assistant Professor Paterson.

This course consists of a study of the breeding types and classes of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

Laboratory.—Practice is given in scoring and judging breeding animals.

104. PRINCIPLES OF FEEDING. Sophomore, junior and senior years, first and second semesters. (Also given in summer school.) Class work, three hours. Three semester credits. Prerequisites: Vet. Med. 205, and Chem. 120. Associate Professor Ferrin.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

106. GENETICS. Sophomore and junior years, first and second semesters. (Also given in summer school.) Class work, three hours. Three semester credits. Prerequisites: Zoöl. 105, and Bot. 105.

This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility and sterility.

108. HISTORY OF BREEDS AND PEDIGREES. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 103. Professor McCampbell.

A study is made of the early history and development of pure-bred domestic animals; also a sufficient study of herdbooks and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text: Plumb's *Types and Breeds of Farm Animals*.

112. PORK PRODUCTION. Junior and senior elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 101 and 104. Associate Professor Ferrin.

This course comprises a systematic study of economical methods of growing, fitting and finishing swine both for breeding purposes and for the market. The laboratory work includes practice in feeding, management and housing of swine.

114. MUTTON PRODUCTION. Junior or senior elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 101 and 104. Assistant Professor Paterson.

A systematic study is made of economic methods of growing, fitting and finishing sheep both for breeding purposes and for market. The laboratory work includes practice in feeding, management, and housing of sheep.

116. ADVANCED STOCK JUDGING I. Junior or senior elective, first semester. Laboratory, six hours. Two semester credits. Prerequisites: An. Husb. 103. Associate Professor Bell.

This course deals with the judging of market classes as well as with all different breeds of purebred stock. The stock is judged in groups of from four to six animals in the same manner that is customary at county or state fairs.

118. ADVANCED STOCK JUDGING II. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 116. Associate Professor Bell.

This is a continuation of An. Husb. 116. During the work of the semester occasional trips are made to the best livestock farms of the State, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the State.

120. MEATS. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: An. Husb. 101 and 104. Assistant Professor Paterson.

This is a course in killing, dressing, cutting and curing meats.

122. BEEF PRODUCTION. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 101 and 104. Professor McCampbell.

This course is devoted to the study of economical methods of growing, fitting and finishing cattle both for breeding purposes and for the market. The laboratory work includes practice in feeding, management and housing of cattle.

124. HORSE PRODUCTION. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: An. Husb. 101 and 104. Associate Professor Bell.

This course includes a study of economic methods of growing, handling and housing horses for breeding purposes, for work and for the market. The laboratory work includes practice in feeding, handling and housing of horses.

126. FORM AND FUNCTION. Elective, first semester. Laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 118, and Pub. Sp. 201. Associate Professor Bell.

A detailed and specific study is made of animal form and type, and influence of type upon function; also of the relation of form, type and condition to growth and development. Comparative measurements are taken of growing and fattening animals, speed and draft horses, mutton and wool sheep, and lard and bacon type of hogs. Special training is given in presenting orally the relative merits of animals of all breeds.

128. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Elective, summer school. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell.

This course is planned to give a general review of the livestock industry, with the purpose of encouraging a better standard of teaching animal husbandry in secondary schools. The course includes work in feeding, breeding, management and history of the various breeds of livestock.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED FEEDING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 104. Associate Professor Ferrin.

This course consists of a survey of the experimental feeding of horses, cattle, sheep and hogs, together with a study of the fundamental and practical feeding problems of the various sections of the country. Emphasis is placed upon the results obtained in the experimental investigation of these problems.

202. LIVESTOCK MARKETING. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: An. Husb. 112, 114, 122, and 124. Professor McCampbell.

This course includes a study of the art of marketing livestock and livestock products; freight and insurance rates in transit, liability of carrier and shipper, terminal charge, etc.; commissions for sale or storage; the relation of market prices of grain and hay upon contemporary values of livestock meat.

204. ANIMAL HUSBANDRY SEMINAR. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: An. Husb. 104. Professor McCampbell.

206. ANIMAL BREEDING. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: An. Husb. 106. Associate Professor ———.

This course involves a study of inheritance as shown by successful breeders and an analysis of inheritance in animals of merit. Emphasis will be placed upon the application of scientific facts to breeding problems.

208. ADVANCED GENETICS. Elective second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: An. Husb. 106. Associate Professor ———.

This course embraces a study of scientific experiments on inheritance, variation, elements of biometry and their practical application to breeding problems.

210. GENETICS SEMINAR. Elective, first semester. Two to five semester credits. Prerequisite: An. Husb. 208. Associate Professor ———.

This course includes the study and criticism of genetic experiments, biological and mathematical methods employed, and the validity of conclusions drawn.

212. RESEARCH IN GENETICS. Elective, first and second semester. Prerequisite: An. Husb. 208. Two to five semester credits. Associate Professor ———.

This course offers opportunity for individual problems in experimental heredity in which small animals or *Drosophila ampelophila* can be employed with laboratory facilities. Problems of an individual nature dealing with practical breeding work can be provided.

214. ADVANCED STUDIES IN PEDIGREES. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: An. Husb. 108. Professor McCampbell.

This course consists of a careful study of the pedigrees and the prepotency of individuals representing the more important strains and families of beef cattle, horses, sheep and swine.

216. SYSTEMS OF LIVESTOCK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites. An. Husb. 112, 114, 122, and 124. Professor McCampbell.

This course includes a study of the relation of livestock production to agriculture. It also includes a study of management, climate, soil, topography, location of markets, land, labor, capital and managing ability as factors influencing the choice and adaptation of systems of production.

218. ADVANCED MEATS. Elective, second semester. Two to four semester credits. Prerequisite: An. Husb. 120. Assistant Professor Paterson.

This course includes grading of carcass, studies in nutritive values of different grades of meats, factors influencing the quality of meats, factors influencing dressing percentage of meat animals, and the identification of meats from different animals.

220. THE WOOL INDUSTRY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: An. Husb. 114. Assistant Professor Paterson.

This course includes a study of the supply of wool and the demand for it, and the method of producing, marketing, storing, grading and manufacturing wool.

Dairy Husbandry

Professor FITCH
Assistant Professor CAVE
Assistant Professor OLSON
Assistant ATKESON

The College dairy farm, including the building and yards, consists of 160 acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for one hundred ten cows. Four silos of modern type, feed rooms, a milk room, and a laboratory exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building and construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure-bred, and a number have been entered in the advanced registry of their respective breeds. The excellence of the dairy herd is shown by an average

production for the past year of over 400 pounds of butter by the Guernseys, 475 pounds by the Ayrshire, over 500 pounds by the Jerseys, and 572 pounds by the Holsteins. Maid Henry, a thirteen-year-old Holstein, produced 19,000 pounds of milk, yielding 835 pounds of butter, in one year. Canary Bell, an Ayrshire, produced in one year 19,863 pounds of milk, containing 744 pounds of butter fat, which is equivalent to 930 pounds of average butter, 80 percent butter fat. This is the highest record ever made in Kansas. Melrose Canary Bell, a daughter of Canary Bell, was the highest tested junior two-year-old for the Ayrshire breed for 1917. Owl's Design ranks high among the Jerseys of the world, with a record of 14,606 pounds of milk produced in one year. She has also produced 764 pounds of butter in a year.

The dairy building houses the creamery, the cheese rooms, the classrooms, and the offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

COURSES IN DAIRY HUSBANDRY

FOR UNDERGRADUATES

101. ELEMENTS OF DAIRYING. Freshman year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Fitch, Assistant Professor Olson, and Mr. Atkeson.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, with the factors influencing the quantity and quality of milk, and with care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter making on the farm. Lectures, supplemented by text, Stocking's *Manual of Milk Products*.

Laboratory.—Practice is given in operating the Babcock test and lactometer, separation of milk, and farm butter making.

102. TYPES AND CLASSES OF LIVESTOCK (VET). Sophomore year, first semester. Assistant Professor Cave.

One-fourth of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

104. DAIRY JUDGING. Freshman year, first and second semesters. Laboratory, three hours. One semester credit. Assistant Professor Cave and Mr. Atkeson.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breeder's Association literature are used as references.

106. DAIRY INSPECTION I. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisites: Bact. 106, Chem. 254 and Dairy Husb. 101. Assistant Professor Olson.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score cards for inspecting and grading milk depots, dairy farms, and creameries. The course is designed to give training in the duties of a city, state, or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Text: Farrington and Woll's *Testing Milk and Its Products*.

108. MILK PRODUCTION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and An. Husb. 104. Professor Fitch.

This course deals with the economical production of milk and with the most approved method of handling the dairy herd, also the construction of dairy barns and buildings, and other subjects which relate to the dairy farmer.

110. BUTTER MAKING AND CREAMERY MANAGEMENT. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Olson.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text: Guthrie's *The Book of Butter*.

Laboratory.—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting, and packing butter; and in keeping complete records of each operation. The work also includes the making of salt, fat, and moisture determinations of the finished product, and judging and scoring butter.

112. HOME DAIRYING. Elective, last half of second semester. Class work, two hours; laboratory, three hours. One and one-half semester credits. Assistant Professor Olson.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course, Poult. Husb. 102, which is offered the first half of the second semester.

114. CHEESE AND ICE-CREAM MAKING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Chem. 254, Bact. 211, and Dairy Husb. 101. Assistant Professor Olson.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given the first half of the semester; the manufacture and handling of ice cream and ices for the retail and wholesale trade in the second half. Text: Van Slyke-Publow's *The Science and Practice of Cheese Making*.

Laboratory.—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations and their influence upon the finished product is noted. Exercises are given in testing, judging and scoring cheese. The latter half of the semester is devoted to the making of ice cream and ices.

116. MARKET MILK. Elective, first semester. Lecture, one hour; laboratory, three hours. Two semester credits. Prerequisites: Dairy Husb. 101 and Bact. 211. Assistant Professor Olson.

This course includes a study of the classes of market milk (certified, inspected and pasteurized, also other classifications), equipment and methods for clean milk production, and the relation of clean milk to producer, dealer, and consumer. Also systems of milk inspection, score cards and milk and cream contests. Lectures are also given on milk plants, including their methods and equipment, such as receiving, storing, separating, removing sediment, pasteurization, bottling and capping, cleaning and sterilizing bottles and cans, the use of homogenizer and emulser and practical laboratory methods of examining milk.

Laboratory.—The work includes actual practice in all the steps in the production of market milk and cream in the College milk plant.

118. DAIRY INSPECTION II. Senior year, second semester. Laboratory, three hours. One semester credit. Assistant Professor Olson.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text: Farrington and Woll's *Testing Milk and Its Products*.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED DAIRY JUDGING. Electives, second semester. Laboratory, three hours. One semester credit. Assistant Professor Cave.

This course is a continuation of Dairy Husb. 104. Visits are made to the best farms in the State and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

202. DAIRY SEMINAR. Elective, second semester. Class work, one hour. One semester credit. Prerequisites: Dairy Husb. 101, 106, and 108. Professor Fitch.

This course includes a study and review of dairy periodicals and experiment station bulletins, books and other dairy literature.

FOR GRADUATES

301. DAIRY RESEARCH. Elective, both semesters. By appointment. Three semester credits. Prerequisites: Dairy Husb. 108 and 110.

This course gives credit on special problems assigned to students. Professor Fitch.

Horticulture

Professor DICKENS
Professor AHEARN
Assistant PICKETT

Assistant DOERNER
Assistant PRATT

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and in the greenhouses.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work in gardens, nurseries, orchards and vineyards. A new small-fruit plantation is being developed, in which will be planted all standard varieties of small fruits. A full equipment of garden tools, spraying machinery and accessories, pruning tools, and special apparatus for floriculture is available at all times for the use of students. The College grounds furnish one of the finest and most complete laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, and the various branches of landscape gardening.

COURSES IN HORTICULTURE

FOR UNDERGRADUATES

101. PLANT PROPAGATION. Freshman year, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Bot. 101. Assistant Pickett.

This course includes a discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. The work is given by means of lectures and assigned readings.

Laboratory.—Practical work is given in the preparation of seeds and in seed testing; in the preparation of seed beds, and in the use of seeding machinery; in transplanting, grafting, budding, and in general nursery practice.

104. SYSTEMATIC POMOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

This course comprises exercises in identification and description of the different types of fruits, such as grapes, peaches, apples, pears and citrus fruits. An intercollegiate exchange of fruit makes possible a valuable study of the effect of climatic conditions upon variety and characteristics. Work is also done in the selection, preparation and judging of fruits for exhibits. Text: Waugh's *Systematic Pomology*.

107. ORCHARDING. Sophomore year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Hort. 101. Professor Dickens and Assistant Pickett.

This course includes studies of the necessary conditions for success with orchards, including location, improvement of soil, application of fertilizers and cultural methods, and pruning. Spraying and pruning practice are given in the laboratory.

Laboratory.—In the laboratory a study is made in laying out plantations and orchards. Various systems of setting, topography of various localities, adaptability of level and hilly sections, methods of setting, pruning for setting, work in orchards with trees of various species and varying ages and a study and observation of cover crops, methods of cropping and general orchard practices up to bearing age are given consideration.

110. SMALL FRUITS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Hort. 101. Professor Ahearn.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations, are considered.

113. FARM FORESTRY. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens.

This course consists of a study of the needs of Kansas farms for windbreaks and wood lots for post and fuel production; also a study of

forest conservation and methods of handling timber. The growing of trees in locations better suited for timber than for other crops is considered; also the composition of windbreaks and their value as a protection to home orchards and fields.

Laboratory.—Laboratory work includes identification of species, methods of forming windbreaks, and nursery work in transplanting trees of various sizes and a determination of the rate of growth of trees under various conditions.

116. DENDROLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ahearn.

In this course a study is made of the classification and identification of forest trees, including a study of forest ecology and taxonomy; of the classification of commercial species, the relative importance of timber species, and the life history and requirements of trees.

Laboratory.—Laboratory work consists of studies in the College arboretum and excursions to near-by wood lots. The student is given an opportunity to become acquainted with trees that succeed well in this State.

119. SILVICULTURE. Elective, second semester. Class work, two hours; field work, three hours. Three semester credits. Prerequisite: Hort. 113 or 116. Professor Dickens.

A study of the business of tree growing for timber and economic purposes. Requirements of species, their range and requirements as to soils, climate and the various factors that determine their reproduction and rate of growth are discussed. Protection of forests from fire and insects and the application of various systems of silviculture are given consideration.

FOR GRADUATES AND UNDERGRADUATES

201. PRACTICAL POMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 104. Professor Ahearn.

The class work is given by means of lectures, and includes practical information on harvesting, grading, packing, storage, marketing, and the use of fruit by-products.

Laboratory.—The laboratory work consists of field work in the harvesting, grading, and packing of fruits. Several types of mechanical graders are used for demonstrations. Intensive work is given in packing of the various types in boxes and barrels. A thorough study is made of storage practice. Practice in pruning work is also given.

204. ORCHARD MANAGEMENT. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Professor Dickens and Assistant Pickett.

The class work includes studies of the following factors that are of vital importance to fruit growers: Location, soil improvement, cultural methods, pruning, capital and equipment for handling orchards, and crop disposition.

Laboratory.—This course offers practice in establishing young orchards, spraying (orchard work), pollination studies, thinning of fruit, summer pruning and problems in orchard management.

207. SPRAYING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Chem. 102. Assistant Pickett.

The class work consists of lectures on spraying machinery, accessories, and the principal materials used as insecticides and fungicides.

Laboratory.—The laboratory work offers exercise in the preparation and testing of spray materials. Special study is given to the construction of the various types of spray machinery. Nozzles and spray guns are carefully tested.

210. MARKET GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Ahearn.

This course is made as practical as possible. In the classroom the lecture work is reinforced with problems concerning the business end of market gardening. The students are required to prepare seed orders and estimate the cost per acre of growing various garden crops. Particular stress is laid upon the harvesting, storing and marketing of vegetables.

Laboratory.—The laboratory work is given in the College gardens. Each student is assigned a plot of ground to plant and care for during the semester. Careful records are kept of cultural operations and the yields. Disease and insect control are studied in a practical way.

213. GARDENING. Sophomore year, second semester. Class work, three hours. Three semester credits. Professor Ahearn.

It is the purpose of this course in gardening to give young women a working knowledge of and a close acquaintance with the garden as it concerns the home. The first part of the course is concerned with the principles of plant growth, relation of soils to plants and the methods necessary for successful work in kitchen gardening, flower beds, window gardening, the requirements of plants in regard to watering, temperatures, hotbeds and the first principles of floriculture.

In the latter part of the course the young women are introduced to the principles of landscape gardening, with particular reference to the problems of home plantings. In conjunction with the lectures, each member of the class is required to prepare plans for town home, farm home and country place, and the classes are required to do group work that will give them an insight into the needs of school grounds. Playgrounds, public parks, and cemeteries are considered and are given a considerable amount of time.

Particular emphasis is placed upon acquaintance with materials that are used for garden purposes. The College campus, gardens, and greenhouses furnish a wealth of material that is best adapted to garden problems and landscape composition.

216. LANDSCAPE GARDENING I. Elective, second semester and summer school. Class work, two hours; laboratory, six hours. Four semester credits. Professor Ahearn.

This course is designed for the individual needs of students and for those who expect to take advanced work in landscape art. The principles of landscape gardening are studied and civic improvement problems discussed, special attention being given to rural and city problems.

Laboratory.—The laboratory consists of field trips and work in fields, in excavation and leveling. Students are instructed in the delineation of landscape plans with special reference to home and city planning.

219. GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, first semester. Class work, three hours. Three semester credits. Professor Ahearn.

This course consists of work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

220. SCHOOL GARDENING. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Assistant Doerner.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeder, and wheel hoes. Allotments of ground areas required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing, are among the subjects considered.

222. HISTORY AND LITERATURE OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours. Two semester credits. Assistant Doerner.

This course consists of a study of the history and literature of landscape gardening with special reference to the early influences as they govern modern design.

225. PLANT MATERIALS IN LANDSCAPE GARDENING. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 101. Professor Ahearn.

A thorough study is made of the hardiness, form, color, habits, and adaptations of trees, both deciduous and evergreen, shrubs, hardy perennials, biennials, and annuals with a view to giving the student a working knowledge of the materials essential to formulate a working landscape plan.

227. LANDSCAPE GARDENING II. Elective, second semester. Laboratory, nine hours. Three semester credits. Professor Ahearn.

A study is made of the more advanced problems of designing and reconstruction from topographic and transit surveys as offered by large areas of parks, playgrounds, and country estates.

230. THE THEORY AND ESTHETICS OF LANDSCAPE GARDENING. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Hort. 222. Assistant Doerner.

A careful study is made of the underlying principles of landscape art and design. This course is primarily intended for students who wish to specialize in landscape work, but will be of interest to all those who intend to teach.

233. TREE SURGERY. Elective, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Bot. 208. Assistant Doerner.

This course consists of a study and practice of the most approved methods of caring for ornamental trees and the technical details of planting, pruning and spraying, bolting, chaining, and cavity work. Shade tree legislation and the duties of shade-tree commissions and tree wardens are discussed.

237. CITY AND TOWN PLANTING. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Assistant Doerner.

This course has to do with laying out parks, boulevards, streets, etc., and with special studies in civic improvement. A special study is also made of cities and towns located in different parts of the world.

Milling Industry

Professor FITZ
Assistant Professor DUNTON
Miller OAKES

The Department of Milling Industry was established primarily to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

COURSES IN MILLING INDUSTRY

FOR UNDERGRADUATES

101. PRINCIPLES OF MILLING. Sophomore year and elective, second semester. Laboratory, three hours. One semester credit. Miller Oakes.

This course includes a study of the theory and practice of milling with demonstrations on a small experimental mill.

102. GRAIN MARKETING. Junior year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Agronomy 101. Professor Fitz.

This course includes a study of methods of handling, storing, marketing and grading of grain; the history of the origin and development of grain inspection and grades; a study of commercial grain grades and government standards; the classification and organization of inspection systems; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

103. GRAIN PRODUCTS. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Milling Industry 102. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products.

FOR GRADUATES AND UNDERGRADUATES

201. MILLING PRACTICE I. Junior year and elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Milling Industry 101. Miller Oakes.

This course consists of practice in the art of milling, with demonstrations on a model mill.

202. MILLING PRACTICE II. Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Milling Industry 201. Miller Oakes.

This course is a continuation of Milling Industry 201.

203. WHEAT AND FLOUR TESTING. Senior year and elective, first semester. Class work, one hour; laboratory, nine hours. Four semester credits. Prerequisites: Milling Industry 103, Chemistry 120, 150 and 260. Assistant Professor Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods of analysis and interpretation of results.

204. EXPERIMENTAL BAKING A. Senior year and elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Milling Industry 203. Assistant Professor Dunton.

This course includes practice in baking tests; comparison of methods, formulas, and flour; and interpretation of results.

205. EXPERIMENTAL BAKING H. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Food and Nut. 106. Assistant Professor Dunton.

This course includes demonstration in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

Poultry Husbandry

Professor LIPPINCOTT
Instructor FOX
Superintendent MUGGLESTONE

The poultry plant, occupying twelve acres and situated just north of the northeast corner of the College campus, is devoted to the breeding and rearing of the stock used for class work. It is equipped with various types of houses, runs, incubators and brooders, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations and in schools and colleges an increasing demand for men with experience and systematic training in handling poultry. There is likewise a growing demand for men to enter poultry-packing houses and for men capable of managing poultry-farming enterprises of considerable proportions.

COURSES IN POULTRY HUSBANDRY

FOR UNDERGRADUATES

101. FARM POULTRY PRODUCTION. Sophomore year, both semesters and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Professor Lippincott and Mr. Fox.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, housing, breeding, incubation, brooding, and preparing poultry for market are studied.

102. HOME POULTRYING. Elective, second semester. Class work, three hours for the first half of the semester. One and one-half semester credits. Professor Lippincott and Mr. Fox.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied. It is given with the elective course, Dairy Husb. 112, the second half of the semester.

104. PRACTICE IN POULTRY FEEDING. Elective, first semester. Three times a day, seven days a week, for a period of six weeks, at hours outside of the regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Mr. Fox.

This course consists of the actual care of a flock of fowls by the student under the supervision of an instructor. Careful records are kept of the feeds consumed and the eggs produced. A financial statement is required at the end of the feeding period.

105. PRACTICE IN INCUBATION. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks at hours outside of regular schedule. One to two semester credits. Prerequisite: Poult. Husb. 101. Mr. Fox.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs and bringing off the hatch. Careful records of fertility, cost of incubation, and varying temperature, moisture, and ventilation conditions are kept. For one credit one successful hatch must be brought off in either a hot-air or hot-water incubator. For further credit other types must be operated. Students specializing in poultry husbandry must take two credits.

107. PRACTICE IN BROODING. Elective, second semester and summer school. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One to three semester credits. Prerequisite: Poult. Husb. 101. Mr. Fox.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the most critical weeks. A report of cost of fuel and feed, of gains in weight and of mortality is required. This course must be preceded or accompanied by practice in incubation. For one credit, a group of at least fifty chicks must be successfully brooded for four weeks, in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders for at least six weeks. Students specializing in poultry husbandry must take three credits.

108. PRACTICE IN MILK FEEDING. Elective, first semester. Twice a day, seven days a week, for a period of six weeks, at hours outside the regular schedule. One semester credit. Prerequisite: Poult. Husb. 101. Mr. Fox.

This course consists of milk feeding poultry confined in crates. The time is divided into periods of two weeks, so that the student will have an opportunity to fatten three lots of chickens. A financial statement is required.

110. POULTRY BREEDS AND TYPES. Elective, first semester and summer school. Class work, one hour; laboratory, three hours. Two semester credits. Mr. Fox.

In this course a historical study is made of the various breeds commonly found on the Kansas farm. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

111. ADVANCED POULTRY JUDGING. Elective, second semester. Laboratory, three hours. One semester credit. Prerequisite: Poult. Husb. 110. Offered alternate years; not given in 1919-1920. Mr. Fox.

This course is a continuation of Poult. Husb. 110, giving further practice in judging the more common varieties, and taking up some of the rarer breeds.

FOR GRADUATES AND UNDERGRADUATES

201. MARKET POULTRY. Elective, first semester and summer school. Class work, one hour; laboratory, three to six hours. Two to three semester credits. Prerequisite: Poult. Husb. 101. Mr. Fox.

In this course the lectures will cover the methods of handling market poultry, alive and dressed. For three hours of laboratory work, practice will be given in candling and grading eggs, caponizing, killing, cooling,

grading and packing poultry for market. When six hours of laboratory work is taken, the student will also feed three lots of chickens for a period of two weeks each.

202. **POULTRY BREEDING.** Elective, second semester. Conferences and laboratory, six hours. Two semester credits. Prerequisite: An. Husb. 106. Professor Lippincott.

The experimental work on inheritance in poultry is reviewed by means of assigned readings and laboratory experiments.

POULTRY FARM MANAGEMENT. See Ag. Ec. 206.

POULTRY BACTERIOLOGY. See Bact. 216.

204. **COMPARATIVE ANATOMY OF DOMESTIC BIRDS.** Elective, second semester. Offered alternate years; not given in 1919-1920. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Zoöl. 117. Professor Lippincott.

This course is designed particularly for those intending to teach or carry on research in poultry husbandry, or who are particularly interested in bird study. The various structures of domestic birds are discussed in the lectures, in their relation to the same structure in wild forms, and in a limited measure to other vertebrates, as well as from a development standpoint.

The laboratory work is given over to the dissection and the first-hand comparison of the structures of the several species of domestic birds common in the central West.

205. **POULTRY RESEARCH.** Elective, first semester. Two to four semester credits. Prerequisites: Poult. Husb. 101, 104, 105 and 107. Professor Lippincott.

In this course the student pursues a definite line of investigation concerning some phases of poultry work. Arrangements must be made to continue this work throughout the second semester when the problem attacked cannot be solved within the limits of the first semester.

Veterinary Medicine

Professor DYKSTRA
Professor GOSS
Professor _____
Associate Professor BURT

Instructor GINGERY
Instructor SCOTT
Instructor HOBBS
Assistant GRIFFITHS
Assistant VAWTER

The Department of Veterinary Medicine gives most of the technical work in the curriculum in veterinary medicine, a general description of which is given elsewhere. The department is housed in the Veterinary Building, which was erected at a cost of over \$60,000, and is thoroughly equipped throughout. It contains modern classrooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room equipped with all of the latest materials necessary to give a course in anatomy second to none on the continent.

For work in histology and pathology the department is exceedingly well provided. It has over thirty large microscopes, equipped with both

high and low power, and several oil immersion objectives, microtomes, the best reflectoscope and projectoscope obtainable, besides a large assortment of histological and pathological slides, materials, and specimens for use in demonstration work in class and laboratory.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive course of laboratory study.

For the study of materia medica and pharmacy there are a general pharmacy laboratory containing all the drugs used in the practice of veterinary medicine, and a practicing pharmacy where medicines are compounded for the everyday practice connected with the College.

For instruction in surgery and clinic the equipment is excellent. The surgical amphitheater is an annex to the main Veterinary Building, seating over three hundred people, and equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The hospital has a capacity of about thirty animals and is nearly always filled with patients, which give ample material for study of internal medicine as well. The out-clinic furnishes many cases yearly, giving the student opportunity to become familiar with the diseases and their treatment under the guidance of proficient practitioners.

The policy adhered to in the instruction in all the departments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the curriculum practical application of these is made in actual field work. This result is a thoroughly scientific veterinary education.

In the arrangement of the schedule of the veterinary curriculum it is implied that the courses should be followed in regular sequence, as each year's work depends upon the work done the previous year. Certain courses, however, may be selected as electives if a student has the necessary prerequisites. These courses are listed in the list of electives.

COURSES IN MATERIA MEDICA

FOR UNDERGRADUATES

131. MATERIA MEDICA I. Sophomore year, second semester. Class work, two hours. Two semester credits. Doctor Gingery.

The course includes definitions of terms, modes of action of drugs in general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

132. MATERIA MEDICA II. Junior year, first semester. Class work, two hours. Two semester credits. Doctor Gingery.

This course is a continuation of Vet. Med. 131.

133. THERAPEUTICS. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Vet. Med. 131 and 132. Doctor Gingery.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included

in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: Winslow's *Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; Wood's *Therapeutics, its Principles and Practice*.

134. PHARMACY. Junior year, first semester. Class and laboratory work, three hours. One semester credit. Doctor Gingery.

In the lectures the meanings of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparation of each is studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case ending, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, a spirit, an avolus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia*; Maltbie's *Practical Pharmacy*; Remington's *Practice of Pharmacy*; Fish's *Exercises in Materia Medica and Pharmacy*.

COURSES IN SURGERY

FOR UNDERGRADUATES

151. SURGERY I. Junior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anæsthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood streams, trachea, spinal canal. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

152. SURGERY II. Junior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

153. SURGERY III. Senior year, first semester. Class work, three hours. Three semester credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

154. SURGERY IV. Senior year, second semester. Class work, three hours. Three semester credits. Doctor Dykstra.

Surgery as taught during this course includes special operations, such as neurectomies, autoplasties, desmotomies, actual cauterization, tenotomies, myotomies, enterotomy and enteroanastomosis, and surgery of the eye. Reference books: Dollar's *Regional Veterinary Surgery*; Meril-

lat's *Veterinary Surgery*, Vols. I, II, and III; Williams' *Surgical Operations*; Fleming's *Operative Veterinary Surgery*, Parts I and II; White's *Restraint of Domestic Animals*.

155. OPERATIVE SURGERY. Senior year, second semester. Laboratory, three hours. One semester credit. Doctors Dykstra and Gingery.

Old horses are purchased by the Department, placed on the operating table, anæsthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antiseptis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

156. HORSESHOEING. Junior year and elective, second semester. Class work, one hour. One semester credit. Doctor Dykstra.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with the study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

COURSE IN OBSTETRICS

FOR UNDERGRADUATES

157. OBSTETRICS. Senior year and elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Vet. Med. 204 and Zoöl. 114, or Vet. Med. 205 and Zoöl. 117. Doctor Dykstra.

This course discusses in detail the physiology of pregnancy, anatomy of the generative organs, care and hygiene of pregnant animals, sterility, diseases incidental to pregnancy, diseases of new-born animals, care of new-born animals, abnormal presentations during parturition, surgery of obstetrics, etc. This work is supplemented by demonstrations on an obstetrical phantom and fœtus; in addition, the College farm and surrounding agricultural territory furnish an abundance of actual material. References: Williams' *Veterinary Obstetrics*, Williams' *Surgical and Obstetrical Operations*, De Bruin's *Bovine Obstetrics*, and Fleming's *Veterinary Obstetrics*.

COURSES IN MEDICINE

FOR UNDERGRADUATES

161. DIAGNOSIS. Junior year, first semester. Class work, two hours. Two semester credits. Doctor ———.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of diseases, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

162. MEDICINE I. Junior year, second semester. Class work, four hours. Four semester credits. Doctor ———.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities, the larynx, bronchi, lungs, and pleura.

163. MEDICINE II. Senior year, first semester. Class work, five hours. Five semester credits. Doctor ———.

This course is devoted to noninfectious diseases of the mouth, salivary glands, œsophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, diseases of metabolism, of the nervous system, of the organs of locomotion, and of the skin.

164. MEDICINE III. Senior year, second semester. Class work, five hours. Five semester credits. Doctor ———.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: Acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa. In addition particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

165. OPHTHALMOLOGY. Senior year, second semester. Class work, one hour. One semester credit. Doctor ———.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Glass' *Diseases of the Dog*; Cadiot's *Clinical Veterinary Medicine*.

166. JURISPRUDENCE. Senior year, second semester. Class work, one hour. One semester credit. Doctor ———.

This course deals with the veterinarian's legal responsibilities, with national and state livestock laws, quarantine regulations, etc.

167. FARM ANIMALS IN HEALTH AND IN DISEASE. Elective, second semester and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Vet. Med. 205. Doctor Gingery.

Study of the domestic animals in relation to their surroundings. First-aid treatment of diseases; contagious and noncontagious diseases; the sound horse. Text: Craig's *Common Diseases of Farm Animals*.

COURSES IN CLINICS

FOR UNDERGRADUATES

171. CLINICS I. Junior year, first semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra and Gingery.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundness, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of antiseptics and other medicinal agents, is taken in charge by the junior students.

172. CLINICS II. Junior year, second semester. Laboratory, nine hours. Three semester credits. Doctors Dykstra and Gingery.
This work is a continuation of Clinics I.

173. CLINICS III. Senior year, first semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra and Gingery.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the veterinary department. These are taken care of by one of the clinicians, who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

174. CLINICS IV. Senior year, second semester. Laboratory, twelve hours. Four semester credits. Doctors Dykstra and Gingery.
This work is a continuation of Clinics III.

COURSES IN ANATOMY

FOR GRADUATES AND UNDERGRADUATES

This branch of veterinary medicine extends over the freshman and sophomore years for veterinary students, and one semester is required in the curriculum in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the Azoux model of the horse. Mounted skeletons and limbs, and loose bones are abundant in the museum. The horse is taken as a type and the other domestic animals are compared with the horse. As often as necessary parts of other animals are dissected to show the differences.

The subjects for dissection are preserved by the injection of a formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts; namely, the head and neck, fore limb and thorax, hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is arranged so that bones are first studied, then the muscles and joints. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, *i. e.*, the abdominal organs are studied by the students at work on the hind limb, etc.

In addition to numerous atlases and charts furnished by the College, the student is required to have Sisson's *Veterinary Anatomy* as a textbook and Sisson's *Dissecting Guide* as a laboratory guide.

201. ANATOMY I. Freshman year, first semester. Class work, three hours; laboratory and dissection, nine hours. Six semester credits. Doctors Burt and Scott.

This course consists of the osteology, or the study of the bones, and the dissection of one-third of the horse. The bones of the horse are studied in detail and a comparison of the bones of other domestic animals, including man and chicken, is made. Drawings of the bones are made by the student in order that he may obtain a better mental picture of

their shape and characteristic parts. The bones of the head are studied separately and collectively. Careful attention is given to the sinuses of the head and points of ossification. For convenience the horse is divided into three regions or parts for dissection; therefore, the one-third dissected during this semester may be any third of the subject, depending upon the part upon which the student is working.

202. ANATOMY II. Freshman year, second semester. Class work, three hours; dissection, twelve hours. Seven semester credits. Prerequisite: Vet. Med. 201. Doctors Burt and Scott.

This course is a continuation of the work begun in Veterinary Medicine 201. The course deals with myology and arthrology. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another, as well as their relations to other important structures. After the muscles are dissected and learned the student dissects the ligaments of the various joints. The student also studies the viscera of the respective part at the time of dissection of that part. Check cards and drawings indicating the different stages of dissection are kept, and the work is checked at frequent intervals.

203. ANATOMY III. Sophomore year, first semester. Class work, one hour; dissection, twelve hours. Five semester credits. Prerequisite: Vet. Med. 202. Doctor Burt.

This course and Veterinary Medicine 204 consist of the study of angiology and neurology, and all parts not previously dissected. Having had osteology and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relation of the blood vessels and nerves. As in Veterinary Medicine 202, the subject is divided into three parts. During this semester two parts will be dissected, leaving one part for Veterinary Medicine 204. Drawings are required as in Veterinary Medicine 202.

204. ANATOMY IV. Sophomore year, second semester. Class work, one hour; dissecting, six hours. Three semester credits. Prerequisite: Vet. Med. 203.

This course is a continuation of Veterinary Medicine 203. The student will now complete the dissection of every part of the subject, including special parts, as the foot, brain, eye, etc. In addition to the completion of the dissection of the horse, a comparative study of the principal structural differences of the various domestic animals, not studied concurrently with the previous courses, will now be made.

205. ANATOMY AND PHYSIOLOGY. Sophomore year, first semester. Class work, five hours. Five semester credits. Doctors Burt and Scott.

This combined course consists of lectures and demonstrations and is planned to give the agricultural student a general idea of the anatomy or structure of the domestic animal and the functions of the various organs. As far as possible the two parts will be taught concurrently. The object sought is to aid the student in understanding conformation by means of the study and dissection of the structures beneath the skin, at the same time observing the muscles of locomotion and the various levers, both as regards speed and power of draughting. Considerable attention is given to the digestive and genital systems. The functions of the various parts are studied, so that the student can realize and understand the benefits derived from the judicious application of proper breeding, feeding and care of farm stock. Attention will be directed to parts subjected to diseases and perverted physiological functions. Text: In addition to notes, Strangeway's *Anatomy* and F. Smith's *Manual of Veterinary Physiology* will be used.

COURSES IN PHYSIOLOGY

FOR GRADUATES AND UNDERGRADUATES

The courses in physiology consist of Comparative Physiology, and the combined course of Anatomy and Physiology.

211. COMPARATIVE PHYSIOLOGY I. Sophomore year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Vet. Med. 201 and 202, and Chem. 106. Doctors Burt and Scott.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook: *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus, such as kymographs, manometers, tambours, inductoriums, signal magnets, and electric clocks, to make the work interesting and practical, as well as instructive. Many experiments are made by the students upon themselves, as well as upon the domestic animals. Graphic records are made by the students of the blood pressure, rate and amplitude of the pulse, and respiration; also the changes produced by stimulating certain nerves, exercise changes in position, the action of certain drugs, etc. The time of coagulation of the blood of various species of animals and the conditions that influence the rapidity of coagulation are considered. The secretion of the various digestive juices, the conditions that will influence the rate of their secretion and their actions are studied in detail. Laboratory directions are furnished the student. References: *Practical Physiology*, Pembry; Halliburton's *Essentials of Chemical Physiology*; *Manual of Physiology*, Stewart; *Urine of the Horse and Man*, Fish; and other standard textbooks on physiology.

212. COMPARATIVE PHYSIOLOGY II. Sophomore year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Burt and Scott.

The work of this semester is a continuation of Vet. Med. 211, and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook: Smith's *A Manual of Veterinary Physiology*.

Laboratory.—The work done exemplifies the lectures given in the classroom. Graphic records are made of the normal muscle contraction, the changes brought about by fatigue, tetanus, variations in temperature, application of drugs, etc. The conductivity of the nerves, nerve blocking, the effects of anaesthetics upon the conductivity of the nerves, reflexes, and other phenomena relating to the nervous system are studied. The composition of the normal urine and the tests applicable for the detection of abnormal constituents in pathologic urine are carefully considered. Directions and references are the same as in the laboratory course in Comparative Physiology I.

COURSES IN HISTOLOGY

FOR GRADUATES AND UNDERGRADUATES

Lectures and recitations cover the work, which is done in the laboratory. During the lectures the projectoscope is used to illustrate the tissues studied. It is essential that the student obtain a thorough knowledge of the manipulation of the microscope, of the microscopical structure of the normal animal tissues, and of the methods of fixing, embedding, sectioning, staining and mounting tissues. This work gives the

foundation for the study of pathological histology. Each student must prepare a full set of slides, from which he makes high- and low-power drawings.

221. HISTOLOGY I. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Goss and Vawter.

The first part of the semester is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with tissue. The fundamental tissues are next studied: epithelial tissues with regard to form, structure, arrangement and location; connective tissues with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. Also, the blood forming organs as bone-marrow, lymph glands, and spleen are studied. The histology of the digestive tract is studied, including study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands, and the œsophagus. In this semester the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

222. HISTOLOGY II. Freshman year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Doctors Goss and Vawter.

In this semester the student takes up the study of the stomachs of the dog, the horse, and the ox; the small intestines—duodenum, jejunum, and ileum; the large intestines—cæcum, colon, rectum and anus; liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, bronchi and lungs; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. During this semester the student stains, mounts, studies with microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatine mass to bring out the blood vessels. Textbook: *Histology*, by Stohr, or *Histology*, by Bailey.

COURSES IN PATHOLOGY

FOR GRADUATES AND UNDERGRADUATES.

The laboratory is equipped with microscopes, microtomes, paraffin ovens, microphotographic and projection apparatus. Each student is furnished with a microscope, and locker containing staining dishes and stains. Material is furnished the student for embedding, sectioning and staining tissues for microscopic study. In addition, the student is furnished for study many mounted slides, which contain the pathological lesions to which the domestic animals are subject. In addition to this, the material from the postmortem of animals and that sent to the College from over the State furnish ample material for laboratory diagnosis.

241. PATHOLOGY I. Junior year, first semester. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Vet. Med. 222 and 212 and Bact. 111. Doctors Goss and Vawter.

The course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory

disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification and concrement formation; and process of repair, tumors, and functional disturbances. Text: *Comparative General Pathology*, by Kitt.

242. PATHOLOGY II. Junior year, second semester. Class work, four hours; laboratory, six hours. Six semester credits. Doctors Goss and Vawter.

This course is devoted to special pathology and pathological technique; collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbooks: *Pathology*, by Delafield and Prudden; *Pathologische Anatomie*, by Kitt; and *Pathology*, Vol. II, by Adami and Nichols.

243. PATHOLOGY III. Senior year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Doctors Goss and Vawter.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turns in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text: *Pathology of Infectious Diseases*, by Moore.

244. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS I. Elective, first and second semesters. Laboratory, six hours. Two semester credits. Prerequisite: Vet. Med. 243. Doctors Goss and Vawter.

This course consists of practice in post-mortem and laboratory diagnosis. The various methods of embedding and staining tissues are carried out upon the large collection of material which the laboratory contains, as well as the material which is constantly coming into the laboratory from various parts of the State.

245. PATHOLOGICAL TECHNIQUE AND DIAGNOSIS II. Elective, first and second semesters. Laboratory, eight hours. Four semester credits. Doctors Goss and Vawter.

This course is a continuation of Vet. Med. 244.

246. MEAT INSPECTION. Senior year, first semester. Class work, two hours. Two semester credits. Doctor Goss.

The course in meat inspection is designed to prepare men for national, state, and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City or Wichita. Text: Edelman's *Meat Hygiene*, translated by Mohler and Eichorn.

Agriculture in the Summer School

During recent years the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the State has been the lack of properly prepared teachers. The recent Federal Smith-Hughes act and its acceptance by the State of Kansas will within a few years lead to a large demand for teachers of vocational agriculture in Kansas high schools. The world war has both increased the demand for teachers of agriculture and demonstrated the necessity of the introduction of vocational agriculture into the high schools. The Agricultural College stands ready to aid teachers of the State, young women as well as young men, in their preparation to meet these demands, and the Summer School offers to active teachers an exceptional opportunity in this respect.

The work offered in the summer session includes courses in grain crop production, soils, soil fertility, common-school agriculture, livestock judging, principles of feeding, teachers' course in animal husbandry, elements of dairying, dairy judging, poultry production, poultry judging, practice in incubation and brooding, diseases of farm animals, plant propagation, orcharding, school gardening, and methods of teaching agriculture in high schools. Special emphasis is laid upon the subject matter and methods adapted to secondary and elementary schools.

Brief information regarding many of these courses in the Summer School may be found in the department write-ups in this catalogue. For further information write to the Dean of the Summer School.

Special Courses in Agriculture

The Farmers' Short Course and the Course in Testing Dairy Products are grouped with other special courses in another part of the catalogue, and are there described. They may be found by reference to the general index in the back of this book.

Division of Engineering

ANDREY ABRAHAM POTTER, *Dean*

The Division of Engineering offers curricula in agricultural engineering, architecture, civil engineering, electrical engineering, flour-mill engineering, and mechanical engineering, each leading to the degree of bachelor of science in the profession selected.

While the curricula, as scheduled, are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of them in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain courses from the departments of chemistry and geology for some of those in the course in mechanical engineering a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the courses in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology a young man may fit himself for special work in connection with the development of the coal fields of the country. By combining courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated. With the permission of the dean of the division, students desiring to do so may substitute work in military engineering for certain subjects in any of the curricula of the division.

It is believed that the curricula as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not certain what particular branch of the profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

Besides the four-year professional curricula, the Division of Engineering offers:

A three-year curriculum in mechanic arts in the School of Agriculture, with trade practice electives in blacksmithing, carpentry, concrete construction and stationary and traction engines, and

Short winter courses for automobile mechanics, tractor operators, carpenters, machinists, blacksmiths, electricians, radio operators, telegraphers and foundrymen.

These are all discussed elsewhere in this catalogue.

CURRICULUM IN AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is designed to qualify men for engineering work in rural communities; for positions in the farm-machinery and farm-motor industry; for the management of farms where drainage, irrigation or power-farming methods are prevalent; and for the positions of advisors, consulting engineers or architects in connection with farm buildings and equipment.

The work of the first year is the same as in the other engineering curricula. During the last three years about one-third of the time is devoted to agricultural subjects, in order to familiarize the students with the modern methods of scientific agriculture and to enable them to apply engineering principles to agricultural problems in a practical way. Considerable time is also devoted to farm machinery, farm motors, rural architecture, highway engineering, irrigation, drainage, and concrete construction.

The agricultural engineering students are also given considerable training in drawing, shop practice, physics, chemistry, surveying, steam engineering, gas engineering, and electrical engineering.

CURRICULUM IN ARCHITECTURE

The curriculum in architecture aims to provide the technical training which will give a broad and sound foundation for the needs of the practicing architect, as well as the essentials of a liberal education. Although closely associated with and somewhat dependent upon science and engineering, architecture is primarily a fine art; hence the training of the architect, while including the general fundamentals of engineering and science, must be based primarily upon a study and understanding of the basic architectural principles together with the canons of art and good taste. A major portion of the curriculum is therefore devoted to the study of architectural design, supplemented by those subjects preparatory or contributory to it.

Supporting this line of study the student is given a comprehensive view of the development of civilization together with a more detailed study of the history of architecture and of art. Throughout the course draughtsmanship as applied to architectural design and construction, as well as to free-hand drawing and sketching, is given constant attention. Courses dealing with the fundamental principles of building construction, sanitation, heating and lighting, together with a careful study of the properties and uses of building materials, are given simultaneously with the courses in design and drawing.

In addition to the above-outlined professional and technical studies, approximately one-quarter of the curriculum is devoted to more general studies designed to broaden the student's view and to give him the essentials of a liberal education. Thus it is the aim not only to provide a fundamental training upon which the student may base his professional development and advancement, but to afford a training which is in the broadest sense educational.

CURRICULUM IN CIVIL ENGINEERING

The aim of the curriculum in civil engineering, as outlined in this catalogue, is to give the young men taking the work the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years are devoted largely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering curricula of American colleges, and it finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. An introduction to the technical work is given in these years through courses in drawing, shopwork, surveying, and the elementary phases of engineering.

The last two years are devoted largely to technical work. In recognition of the mechanical trend of the age, liberal provision is made for class and laboratory work in mechanical and electrical engineering. In view of the growing importance of municipal problems, such as paving, sewerage and water-supply, the curriculum in civil engineering includes required courses in these subjects.

Advanced elective courses in railroad, highway, and irrigation and drainage engineering are offered in the second semester of the senior year.

CURRICULUM IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. These studies together with introductory courses in drawing, shopwork, surveying and the elementary phases of engineering, occupy most of the time of the first two years. The professional work of this curriculum begins in the junior year and continues throughout the last two years. General culture subjects are included in the work of each of the four years.

Emphasis is placed upon training to deal with the forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The curriculum provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice.

The laboratory experiments selected for the students are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

CURRICULUM IN FLOUR-MILL ENGINEERING

The milling of wheat and other cereals is an important industry in this State. The curriculum in flour-mill engineering is designed to prepare men for the management of mills, for work in connection with the designing of milling plants, and for research work in the preparation and utilization of mill products.

The work of the freshman year is the same as in the other engineering courses. The sophomore year is similar to that of the mechanical engineering course, but includes additional chemistry and a beginning course in milling practice. In the junior and senior years, besides the courses dealing with the production, marketing, testing and milling of grain products, a considerable amount of time is devoted to mechanics, chemistry, history, economics, business law and organization, steam and gas engineering and flour-mill design.

CURRICULUM IN MECHANICAL ENGINEERING

The work in mechanical engineering prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installation; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of engineering buildings and factories, including the selection, purchasing and location of the equipment.

The curriculum has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also endow him with an understanding of the scientific and economic principles necessary for the solution of engineering and industrial problems.

Throughout the four years the theoretical studies in the classroom are supplemented by the practical work in the laboratories in such a manner as very materially to strengthen both. In the materials and machinery testing laboratories the work does not end when the test is completed, but the entire problem must be written up in such a manner as would be approved in the best commercial testing laboratories. The laboratory work in the shops not only gives the student practice in performing the machining and various other mechanical operations, but includes a scientific study of the factors of production, so that the loss of material and the expenditure of human effort will be a minimum.

Students pursuing a mechanical engineering course are urged to spend at least two summers in some shop or commercial plant in order to broaden their training.

Curriculum in Agricultural Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(3-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Engineering Drawing Ap. Mech. 155 2(0-6)	Descriptive Geometry Ap. Mech. 158 2(0-6)
Surveying I Civ. Engr. 102 2(0-6)	Surveying II Civ. Engr. 111 2(0-6)
Extempore Speech I Pub. Spk. 201 2(2-0)	Woodwork Shop 101 1(0-3)
	Forging I Shop 150 1(0-3)
Military Science I Mil. Tr. 101 1(0-3)	Military Science II Mil. Tr. 102 1(0-3)
Engineering Lectures Gen. Engr. 101 R	Engineering Lectures Gen. Engr. 101 R
Physical Education M-I Phys. Ed. 103 (0-2)	Physical Education M-II Phys. Ed. 104 (0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
American Industrial History Hist. 105 3(3-0)	Farm Crops Agron. 103 4(3-3)
Organic Chemistry Chem. 120 3(2-3) <i>or</i>	Field Machinery Farm Engr. 106, 107... 2(1-3)
{ Metallurgy Shop 165 2(2-0) }	
{ Forging II Shop 155 1(0-3) }	
Mechanical Drawing I Ap. Mech. 161 2(0-6)	Foundry Practice Shop 160 1(0-3)
Military Science III Mil. Tr. 103 1(0-3)	Military Science IV Mil. Tr. 104 1(0-3)
Seminar Gen. Engr. 105 R	Seminar Gen. Engr. 105 R
Physical Education M-III Phys. Ed. 105 (0-2)	Physical Education M-IV Phys. Ed. 106 (0-6)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120.... 4(3-3)
Calculus II Math. 116 3(3-0)	Economics Econ. 101 3(3-0)
Soils Agron. 131 4(3-3)	Power Machinery Farm Engr. 111, 112... 2(1-3)
Farm Motors Farm Engr. 125, 126... 3(2-3)	Kinematics Ap. Mech. 180 3(3-0)
Market Grades and Classes of Livestock An. Husb. 101..... 3(1-6)	Tractors and Trucks Farm Engr. 116, 117... 3(2-3) or
Seminar Gen. Engr. 105..... R	Mechanical Drawing II Ap. Mech. 170..... 3(0-9) or
	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
	Machine Tool Work I Shop 170 2(0-6)
	Seminar Gen. Engr. 105..... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Farm Management Ag. Ec. 106..... 3(2-3)	Drainage and Irrigation I Civ. Engr. 161..... 2(2-0)
Principles of Feeding An. Husb. 104..... 3(3-0)	Engineering English Engl. 110 2(2-0)
Rural Architecture Farm Engr. 102..... 3(1-6)	Electrical Engineering C Elect. Engr. 160, 165.. 3(2-2, 1)
Highway Engineering I Civ. Engr. 230 and Ap. Mech. 250 3(2-3)	Concrete Construction Ap. Mech. 140, 145.... 2(1-3)
Business Law I Hist. 153 1(1-0)	Steam and Gas Engineering C Steam and Gas 120, 125, 3(2-3)
Business Organization Econ. 204 1(1-0)	Elements of Dairying Dairy Husb. 101..... 3(2-3) or
Advanced Farm Machinery Farm Engr. 201..... 2(0-6)	Soil Fertility Agron. 132 3(2-2, 1)
Pattern Making Shop 145 1(0-3)	
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis Ap. Mech. 150, Civ. Engr. 170, Farm Engr. 175, Shop 195, or Steam and Gas 195, R	Thesis Ap. Mech. 150, Civ. Engr. 170, Farm Engr. 175, Shop 195, or Steam and Gas 195, R

Curriculum in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Plane Trigonometry	College Algebra
Math. 101 3(3-0)	Math. 104 3(3-0)
Perspective	Shades and Shadows
Arch. 127 2(0-6)	Arch. 130 2(0-6)
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Engineering Drawing	Descriptive Geometry
Ap. Mech. 155 2(0-6)	Ap. Mech. 158 2(0-6)
Freehand Drawing I	Freehand Drawing II
Arch. 111 2(0-6)	Arch. 114 2(0-6)
Architectural Drawing I	Architectural Drawing II
Arch. 108 2(0-6)	Arch. 109 2(0-6)
Materials of Construction I	Materials of Construction II
Arch. 135 2(2-0)	Arch. 138 2(2-0)
Military Science I	Military Science II
Mil. Tr. 101 1(0-3)	Mil. Tr. 102 1(0-3)
Engineering Lectures	Engineering Lectures
Gen. Engr. 101 R	Gen. Engr. 101 R
Physical Education M-I	Physical Education M-II
Phys. Ed. 103 (0-2)	Phys. Ed. 104 (0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I	Engineering Physics II
Physics 211 5(4-2, 1)	Physics 212 5(4-2, 1)
French I	French II
Mod. Lang. 151 3(3-0)	Mod. Lang. 152 3(3-0)
History of Architecture I	History of Architecture II
Arch. 153 2(2-0)	Arch. 156 2(2-0)
Working Drawings and Specifications I	Working Drawings and Specifications II
Arch. 168 2(0-6)	Arch. 169 2(0-6)
Freehand Drawing III	Freehand Drawing IV
Arch. 116 2(0-6)	Arch. 117 2(0-6)
Design I	Design II
Arch. 142 3(0-9)	Arch. 144 3(0-9)
Military Science III	Military Science IV
Mil. Tr. 103 1(0-3)	Mil. Tr. 104 1(0-3)
Seminar	Seminar
Gen. Engr. 105 R	Gen. Engr. 105 R
Physical Education M-III	Physical Education M-IV
Phys. Ed. 105 (0-2)	Phys. Ed. 106 (0-2)

JUNIOR

FIRST SEMESTER		SECOND SEMESTER	
Applied Mechanics A-I		Applied Mechanics A-II	
Ap. Mech. 102.....	3(3-0)	Ap. Mech. 116, 121.....	4(3-3)
Graphic Statics		History of Architecture IV	
Ap. Mech. 125.....	1(0-3)	Arch. 161	2(2-0)
History of Architecture III		Freehand Drawing VI	
Arch. 159	2(2-0)	Arch. 120	2(0-6)
Freehand Drawing V		Design IV	
Arch. 118	2(0-6)	Arch. 147	5(0-15)
Design III		Elective*	
Arch. 145	5(0-15)	5(-)	
Elective*		Seminar	
5(-)		Gen. Engr. 105.....	
Seminar		R	
Gen. Engr. 105.....		R	

SENIOR

FIRST SEMESTER		SECOND SEMESTER	
Civilization and Art I		Civilization and Art II	
Arch. 183	3(3-0)	Arch. 185	3(3-0)
Freehand Drawing VII		Freehand Drawing VIII	
Arch. 121	2(0-6)	Arch. 123	2(0-6)
Design V		Design VI	
Arch. 148	8(0-24)	Arch. 151	8(0-24)
Domestic Architecture		Office Practice	
Arch. 172	2(0-6)	Arch. 191	3(3-0)
Economics		Engineering English	
Econ. 101	3(3-0)	Engl. 110	2(2-0)
Seminar		Seminar	
Gen. Engr. 105.....		Gen. Engr. 105.....	
R		R	

* Electives are to be chosen with the advice and approval of the Dean of the Division and the Professor of Architecture.

Curriculum in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(3-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	Descriptive Geometry Ap. Mech. 158..... 2(0-6)
Surveying I Civ. Engr. 102..... 2(0-6)	Surveying II Civ. Engr. 111..... 2(0-6)
Extempore Speech Pub. Spk. 201..... 2(2-0)	Woodwork Shop 101 1(0-3)
	Forging I Shop 150 1(0-3)
Military Science I Mil. Tr. 101..... 1(0-3)	Military Science II Mil. Tr. 102..... 1(0-3)
Engineering Lectures Gen. Engr. 101..... R	Engineering Lectures Gen. Engr. 101..... R
Physical Education M-I Phys. Ed. 103..... (0-2)	Physical Education M-II Phys. Ed. 104..... (0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 113 5(5-0)
American Industrial History Hist. 105 3(3-0)	Metallurgy Shop 165 2(2-0)
Surveying III Civ. Engr. 151, 155.... 3(2-3)	Surveying IV Civ. Engr. 156, 157.... 3(2-3)
Mechanical Drawing I Ap. Mech. 161..... 2(0-6)	Civil Engineering Drawing I Civ. Engr. 125..... 2(0-6)
Military Science III Mil. Tr. 103..... 1(0-3)	Military Science IV Mil. Tr. 104..... 1(0-3)
Seminar Gen. Engr. 101..... R	Seminar Gen. Engr. 101..... R
Physical Education M-III Phys. Ed. 105..... (0-2)	Physical Education M-IV Phys. Ed. 106..... (0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105..... 4(3-3)	Applied Mechanics II Ap. Mech. 110, 120..... 6(5-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Engineering Geology Geol. 102 4(2-6)	Railway Engineering I Civ. Engr. 145..... 2(2-0)
Masonry and Foundations Civ. Engr. 120..... 2(2-0)	Drainage and Irrigation I Civ. Engr. 161..... 2(2-0)
Economics Econ. 101 3(3-0)	Steam and Gas Engineering C Steam and Gas 120, 125, 3(2-3)
Business Law I Hist. 153 1(1-0)	
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Bridge Stresses Civ. Engr. 201..... 4(4-0)	Bridge Design Civ. Engr. 246..... 3(0-9)
Civil Engineering Drawing II Civ. Engr. 205..... 2(0-6)	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
Astronomy and Geodesy Civ. Engr. 210, 215.... 4(3-3)	Engineering English Engl. 110 2(2-0)
Water Supply Civ. Engr. 220..... 2(2-0)	Business Organization Econ. 204 1(1-0)
Sewerage Civ. Engr. 225..... 2(2-0)	Concrete Design Civ. Engr. 250, 255.... 3(2-3)
Highway Engineering I Civ. Engr. 230 and Ap. Mech. 250..... 3(2-3)	Railway Engineering II Civ. Engr. 260, 265.... 4(2-6) or
	Highway Engineering II Civ. Engr. 270, 275.... 4(2-6) or
	Drainage and Irrigation II Civ. Engr. 280, 285.... 4(2-6)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis Ap. Mech. 150 or Civ. Engr. 170..... R	Thesis Ap. Mech. 150 or Civ. Engr. 170..... R

Curriculum in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
Chemistry E-I Chem. 107 4(3-3)	Chemistry E-II Chem. 108 4(3-3)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
College Rhetoric I Engl. 101..... 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	Descriptive Geometry Ap. Mech. 158..... 2(0-6)
Extempore Speech I Pub. Spk. 201..... 2(2-0)	Woodwork Shop 101 1(0-3)
	Forging I Shop 150 1(0-3)
Electrical Machinery and Construction Elect. Engr. 170..... 2(0-6) <i>or</i>	Surveying I Civ. Engr. 102..... 2(0-6) <i>or</i>
Surveying I Civ. Engr. 102..... 2(0-6)	Electrical Machinery and Construction Elect. Engr. 170..... 2(0-6)
Military Science I Mil. Tr. 101..... 1(0-3)	Military Science II Mil. Tr. 102..... 1(0-3)
Engineering Lectures Gen. Engr. 101..... R	Engineering Lectures Gen. Engr. 101..... R
Physical Education M-I Phys. Ed. 103..... (0-2)	Physical Education M-II Phys. Ed. 104..... (0-2)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus I Math. 118 5(5-0)
Kinematics Ap. Mech. 180..... 3(3-0)	American Industrial History Hist. 105 3(3-0)
Mechanical Drawing I Ap. Mech. 161..... 2(0-6)	Mechanical Drawing II Ap. Mech. 170..... 3(0-9)
Metallurgy Shop 165 2(2-0)	Foundry Practice Shop 160 1(0-3)
Forging II Shop 155 1(0-3)	Military Science IV Mil. Tr. 104..... 1(0-3)
Military Science III Mil. Tr. 103..... 1(0-3)	Seminar Gen. Engr. 105..... R
Seminar Gen. Engr. 105..... R	Physical Education M-IV Phys. Ed. 106..... (0-2)
Physical Education M-III Phys. Ed. 105..... (0-2)	

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics E-II Ap. Mech. 115, 120.... 4(3-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Economics Econ. 101 3(3-0)	
Direct Current Machines I Elect. Engr. 101, 105... 4(3-2, 1)	Direct Current Machines II Elect. Engr. 110, 115... 4(3-2, 1)
Electrical Measurements Elect. Engr. 121, 126... 2(1-2, 1)	Alternating Current Machines I Elect. Engr. 201, 205... 3(2-2, 1)
Pattern Making Shop 145 1(0-3)	Machine Tool Work I Shop 170 2(0-6)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
Alternating Current Machines II Elect. Engr. 210, 215... 6(4-4, 2)	Electric Railways Elect. Engr. 240..... 2(2-0)
Electrical Machine Design I Elect. Engr. 150..... 1(0-3)	Electrical Machine Design II Elect. Engr. 155..... 2(0-6)
Telephony Elect. Engr. 220, 225... 3(2-3)	Illuminating Engineering Elect. Engr. 235, 236... 3(2-3)
Factory Engineering Shop 245, 250..... 2(1-3)	Business Law I Hist. 153 1(1-0)
	Business Organization Econ. 204 1(1-0)
	Engineering English Engl. 110 2(2-0)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis Elect. Engr. 195..... R	Thesis Elect. Engr. 195..... R

Curriculum in Flour-mill Engineering.

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
Chemistry E-I		Chemistry E-II	
Chem. 107	4(3-3)	Chem. 108	4(3-3)
Plane Trigonometry		College Algebra	
Math. 101	3(3-0)	Math. 104	3(3-0)
College Rhetoric I		College Rhetoric II	
Engl. 101	3(3-0)	Engl. 104	3(3-0)
Extempore Speech			
Pub. Spk. 201.....	2(2-0)		
Engineering Drawing		Descriptive Geometry	
Ap. Mech. 155.....	2(0-6)	Ap. Mech. 158.....	2(0-6)
Woodwork		Elements of Steam and Gas Power	
Shop 101	1(0-3)	Steam and Gas 130.....	2(0-6)
Forging I		Surveying I	
Shop 150	1(0-3)	Civ. Engr. 102.....	2(0-6)
Military Science I		Military Science II	
Mil. Tr. 101.....	1(0-3)	Mil. Tr. 102.....	1(0-3)
Engineering Lectures		Engineering Lectures	
Gen. Engr. 101.....	R	Gen. Engr. 101.....	R
Physical Education M-I		Physical Education M-II	
Phys. Ed. 103.....	(0-2)	Phys. Ed. 104.....	(0-2)

SOPHOMORE

FIRST SEMESTER		SECOND SEMESTER	
Engineering Physics I		Engineering Physics II	
Physics 211	5(4-3)	Physics 212	5(4-3)
Plane Analytical Geometry		Calculus I	
Math. 110	4(4-0)	Math. 113	5(5-0)
Organic Chemistry		Kinematics	
Chem. 120	3(2-2, 1)	Ap. Mech. 180.....	3(3-0)
Business Law I			
Hist. 153	1(1-0)		
Mechanical Drawing I		Mechanical Drawing II	
Ap. Mech. 161.....	2(0-6)	Ap. Mech. 170.....	3(0-9)
Quantitative Analysis I		Principles of Milling	
Chem. 150	2(0-6)	Mill. Ind. 101.....	1(0-3)
Military Science III		Military Science IV	
Mil. Tr. 103.....	1(0-3)	Mil. Tr. 104.....	1(0-3)
Seminar		Seminar	
Gen. Engr. 105.....	R	Gen. Engr. 105.....	R
Physical Education M-III		Physical Education M-IV	
Phys. Ed. 105.....	(0-2)	Phys. Ed. 106.....	(0-2)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I	Applied Mechanics E-II
Ap. Mech. 101, 105.... 4(3-3)	Ap. Mech. 115, 120.... 4(3-3)
Calculus II	Hydraulics
Math. 116 3(3-0)	Ap. Mech. 130, 135.... 4(3-3)
Advanced Quantitative Analysis	Economics
Chem. 260 2(0-6)	Econ. 101 3(3-0)
Grain Crop Production	Grain Products
Agron. 101 3(2-3)	Mill. Ind. 103..... 2(2-0)
Grain Marketing	Milling Practice I
Mill. Ind. 102..... 3(3-0)	Mill. Ind. 201..... 3(1-6)
Machine Tool Work I	Milling Entomology
Shop 170 2(0-6)	Ent. 116 1(1-0)
Seminar	Seminar
Gen. Engr. 105..... R	Gen. Engr. 105..... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Wheat and Flour Testing	Experimental Baking A
Mill. Ind. 203..... 4(1-9)	Mill. Ind. 204..... 2(0-6)
Flour Mill Design	Milling Practice II
Ap. Mech. 215..... 2(0-6)	Mill. Ind. 202..... 2(0-6)
Steam and Gas Engineering I	Steam and Gas Engineering II
Steam and Gas 101, 105, 5(4-3)	Steam and Gas 110, 115, 4(3-3)
American Industrial History	Refrigeration, Heating, and Ventilation
Hist. 105 3(3-0)	Steam and Gas 210, 215, 3(2-3)
Business Organization	Electrical Engineering C
Econ. 204 1(1-0)	Elect. Engr. 160, 165... 3(2-2, 1)
Factory Engineering	Engineering English
Shop 245, 250..... 2(1-3)	Engl. 110 2(2-0)
Seminar	Seminar
Gen. Engr. 105..... R	Gen. Engr. 105..... R
Thesis	Thesis
Ap. Mech. 150, Shop 195 or	Ap. Mech. 150, Shop 195 or
Steam and Gas 195..... R	Steam and Gas 195..... R

Curriculum in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER		SECOND SEMESTER	
Chemistry E-I		Chemistry E-II	
Chem. 107	4(3-3)	Chem. 108	4(3-3)
Plane Trigonometry		College Algebra	
Math. 101	3(3-0)	Math. 104	3(3-0)
College Rhetoric I		College Rhetoric II	
Engl. 101	3(3-0)	Engl. 104	3(3-0)
Engineering Drawing		Descriptive Geometry	
Applied Mech. 155	2(0-6)	Ap. Mech. 158	2(0-6)
Extempore Speech		Surveying I	
Pub. Spk. 201	2(2-0)	Civ. Engr. 102	2(0-6)
Woodwork		Elements of Steam and Gas Power	
Shop 101	1(0-3)	Steam and Gas 130	2(0-6) or
Forging I		Woodwork	
Shop 150	1(0-3)	Shop 101	1(0-3)
Elements of Steam and Gas Power		Forging I	
Steam and Gas 130	2(0-6)	Shop 150	1(0-3)
Military Science I		Military Science II	
Mil. Tr. 101	1(0-3)	Mil. Tr. 102	1(0-3)
Engineering Lectures		Engineering Lectures	
Gen. Engr. 101	R	Gen. Engr. 101	R
Physical Education M-I		Physical Education M-II	
Phys. Ed. 103	(0-2)	Phys. Ed. 104	(0-2)

SOPHOMORE

FIRST SEMESTER		SECOND SEMESTER	
Engineering Physics I		Engineering Physics II	
Physics 211	5(4-3)	Physics 212	5(4-3)
Plane Analytical Geometry		Calculus I	
Math. 110	4(4-0)	Math. 113	5(5-0)
Kinematics		American Industrial History	
Ap. Mech. 180	3(3-0)	Hist. 105	3(3-0)
Mechanical Drawing I		Mechanical Drawing II	
Ap. Mech. 161	2(0-6)	Ap. Mech. 170	3(0-9)
Metallurgy		Foundry Practice	
Shop 165	2(2-0)	Shop 160	1(0-3)
Forging II		Military Science IV	
Shop 155	1(0-3)	Mil. Tr. 104	1(0-3)
Military Science III		Seminar	
Mil. Tr. 103	1(0-3)	Gen. Engr. 105	R
Seminar		Physical Education M-IV	
Gen. Engr. 105	R	Phys. Ed. 106	(0-2)
Physical Education M-III			
Phys. Ed. 105	(0-2)		

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics I Ap. Mech. 101, 105.... 4(3-3)	Applied Mechanics II Ap. Mech. 110, 120.... 6(5-3)
Calculus II Math. 116 3(3-0)	Hydraulics Ap. Mech. 130, 135.... 4(3-3)
Steam and Gas Engineering I Steam and Gas 101, 105, 5(4-3)	Steam and Gas Engineering II Steam and Gas 110, 115, 4(3-3)
Business Law I Hist. 153 1(1-0)	
Mechanical Drawing III Ap. Mech. 175..... 1(0-3)	
Graphic Statics Ap. Mech. 125..... 1(0-3)	Pattern Making Shop 145 1(0-3)
Machine Tool Work I Shop 170 2(0-6)	Machine Tool Work II Shop 225 2(0-6)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Electrical Engineering M-I Elect. Engr. 130 135... 4(3-2, 1)	Electrical Engineering M-II Elect. Engr. 140, 145... 4(3-2, 1)
Power Plant Engineering Steam and Gas 206..... 3(0-9)	Refrigeration, Heating and Ventilation Steam and Gas 210, 215, 3(2-3)
Machine Design I Ap. Mech. 201, 205.... 5(3-6)	Machine Design II Ap. Mech. 210..... 2(0-6)
Factory Engineering Shop 245, 250..... 2(1-3)	Factory Design Shop 255 2(0-6)
Economics Econ. 101 3(3-0)	Engineering English Engl. 110 2(2-0)
	Business Organization Econ. 204 1(1-0)
	Machine Tool Work III Shop. 230 1(0-3)
Seminar Gen. Engr. 105..... R	Seminar Gen. Engr. 105..... R
Thesis. Ap. Mech. 150, Shop 195 or Steam and Gas 195..... R	Thesis Ap. Mech. 150, Shop 195 or Steam and Gas 195..... R

Applied Mechanics and Machine Design

Professor SEATON
 Assistant Professor WENDT
 Assistant Professor PEARCE
 Instructor _____
 Instructor _____

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of determining the forces acting on the parts of structures and machines, and the effect of these forces on the parts. The courses are intended to be of a highly practical character. For the purpose of better fixing in the mind of the student the principles taught, the solution of a large number of problems is required. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction. The textbooks in several of the courses are supplemented by notes and assigned reference work.

All laboratory tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required of the students on all laboratory exercises.

APPLIED MECHANICS LABORATORIES†

The strength of materials laboratory is provided with a 50,000-pound and a 100,000-pound Riehle universal testing machine, a 200,000-pound Olsen universal testing machine adapted for receiving columns up to 15 feet in height and beams up to 20 feet in length, a K. S. A. C.-Miller 250,000 inch-pound torsion testing machine, a 10,000-pound Riehle beam-testing machine, an Upton-Lewis toughness testing machine, and the auxiliary apparatus usually found in well-equipped laboratories.

It also contains transmission and absorption dynamometers, a Shore scleroscope, a Brinnell hardness machine, two Berry strain gauges, several extensometers and deflectometers, planimeters, micrometers, slide rules, jacks, hoists, scales, gauges and other small instruments for taking weights and measures. A complete set of standard test weights ranging from one grain to 600 pounds total capacity is provided for the calibration of weighing apparatus.

The cement and concrete laboratory contains one each of Olsen, Riehle and Fairbanks 1,000-pound automatic shot cement-testing machines; one Ro-Top Sieve Shaker; two Vicat needles and one set of Gilmore needles for testing the consistency of cement paste; one steaming oven for accelerated tests; one electric drying oven; one large water-jacketed drying oven; several single wall drying ovens; a moist closet; immersion storage tanks; a complete set of fineness sieves from 4 meshes to 200 meshes per linear inch, including No. 20-mesh, 30-mesh and 200-mesh sieves certified by the U. S. Bureau of Standards; various scales and balances; and a full equipment of briquette, cube and cylindrical molds, including a large number of 8 in. by 16 in. cylindrical cast-iron molds for concrete. The

† These laboratories have been designated by law as the official testing laboratories for the State Highway Commission of Kansas.

laboratory also contains one Hobbs concrete building-block machine, one Miles block machine, and molds for various cast concrete products, such as drainage tile and fence posts.

The road materials laboratory contains an Olsen standard rattler for testing paving brick, two K. S. A. C. standard brick rattlers, two ball mills, a briquette former, a Page impact machine for cementation tests, a Page impact machine for toughness tests, two Deval abrasion machines, a Dorry hardness machine, a diamond saw, a core drill press with drills, and mechanical analysis sieves ranging from 3-inch holes to 200 meshes per linear inch. For the testing of bituminous road materials, the equipment includes an N. Y. T. L. penetrometer, Scott viscosimeter, Forrest aggregate extractor, Smith ductility machine, New York State Board of Health oil tester, open-cup tester, N. Y. T. L. copper drying oven, Hubbard pycnometers, Becker analytical balance, and the necessary glassware and other auxiliary apparatus.

HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits each of 25,000 gallons capacity, equipped with rectangular, triangular and trapezoidal weirs, an air-pressure tank, two hydraulic rams, two 4-inch volute centrifugal pumps, one 6-inch Hill-Tripp centrifugal pump, one 15-inch Layne and Bowler three-stage deepwell centrifugal pump, one positive rotary pump, one deep-well reciprocating pump, a water motor, a Pelton-Doble water wheel, a Trump water turbine, a small Price current meter, a Haskell current meter, electric motors for driving the pumps, and many pieces of small apparatus, such as an orifice tank, weirs, scales, tanks, hook gauges, pressure gauges, pressure regulators, water meters, including a 6-inch Venturi meter, and manometers.

COURSES IN APPLIED MECHANICS

FOR UNDERGRADUATES

101. APPLIED MECHANICS I RECITATION. Junior year, first semester and summer school. Class work, three hours. Three semester credits. Prerequisites: Calculus I. (Math. 113) and Engineering Physics II (Physics 212). Professor Seaton, Assistant Professors Wendt and Pearce, and Mr. ———.

A study is made of the composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid-bodies and the resulting motions; work energy and power; graphical solution of problems in statics. Text: Riggs' *Hancock's Applied Mechanics for Engineers*.

102. APPLIED MECHANICS A-I RECITATION. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisites: Analytical geometry (Math. 110), and Engineering Physics I (Physics 211). Professor Seaton, Assistant Professors Wendt and Pearce.

This course comprises a study of statics, with applications to stresses in structures; center of gravity; moment of inertia. Algebraic methods are generally employed, supplemented by graphic construction and numerous examples.

105. APPLIED MECHANICS I LABORATORY. Junior year, first semester and summer school. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics I Recitation. Assistant Professor Wendt and Mr. ———.

Exercises given in the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Text: Carpenter and Diedrichs' *Experimental Engineering*. (This text is also used in the subsequent laboratory courses in applied mechanics and hydraulics, and in steam and gas engineering.)

110. APPLIED MECHANICS II RECITATION. Junior year, second semester. Class work, five hours. Five semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professors Wendt and Pearce, and Mr. ———.

Behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol. I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professors Wendt and Pearce, and Mr. ———.

The subject matter of this course is similar to that of Applied Mechanics II, but much less time is devoted to the study of continuous girders and of reinforced concrete. Text: Boyd's *Strength of Materials*.

116. APPLIED MECHANICS A-II RECITATION. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisites: Applied Mechanics A-I Recitation. Professor Seaton, Assistant Professors Wendt and Pearce.

Behavior of materials subjected to tension, compression and shear; strength and stiffness of simple beams; moment and shear in flexure of beams, with diagrams; design of beams of wood, steel and reinforced concrete and design and investigation of columns.

120. APPLIED MECHANICS II OR E-II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics II or E-II Recitation. Professor Seaton, Assistant Professor Wendt, and Mr. ———.

Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. These include standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on cement, on fine and coarse aggregates for concrete, and on brick.

121. APPLIED MECHANICS A-II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. Must accompany or follow Applied Mechanics A-II Recitation. Assistant Professor Wendt and Mr. ———.

This course comprises the use of micrometers, planimeters, and slide rules and a study of the various testing machines. Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. Tests are also made on cement and on the fine and coarse aggregates for concrete.

125. GRAPHIC STATICS. Junior year, first semester. Drafting-room practice, supplemented by lectures, three hours. One semester credit. Must accompany or follow Applied Mechanics I or A-I. Professor Seaton and Assistant Professor Wendt.

Graphical solutions are made of the stresses existing in a number of typical trusses, under a variety of loadings, and a detail design is made of one of the simpler forms of roof trusses.

130. HYDRAULICS RECITATION. Junior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professor Wendt, and Mr. ———.

A study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and its measurement; Kutter's formula; impulse and reaction of a jet; elements of water power, impulse wheels, reaction turbines and centrifugal pumps. Text: Daugherty's *Hydraulics*.

135. HYDRAULICS LABORATORY. Junior year, both semesters. Laboratory work, three hours. One semester credit. Must accompany or follow Hydraulics Recitation (Ap. Mech. 130). Professor Seaton, Assistant Professor Wendt, and Mr. ———.

Tests to determine the coefficients of weirs, orifices, tubes and pipes; use and calibration of water meters; tests to determine loss of head in pipes due to various causes; measurement of water in open streams, and tests on water wheels, water turbines, rams and pumps.

140. CONCRETE CONSTRUCTION RECITATION. Senior year and elective, both semesters and summer school. Lectures and recitations, one hour. One semester credit. Professor Seaton and Assistant Professor Wendt.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete, elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and the waterproofing and coloring of concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

145. CONCRETE CONSTRUCTION LABORATORY. Senior year and elective, both semesters. Laboratory work, three hours. One semester credit. This course must accompany or follow Concrete Construction Recitation (Ap. Mech. 140). Professor Seaton, Assistant Professor Wendt, and assistants.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

150. THESIS. Senior year, continuing through the year. Professor Seaton and Assistant Professor Wendt.

The laboratories of the Department furnish an excellent opportunity for experimental work suitable for thesis projects of students in any branch of engineering. Projects in machine design may also be worked out as theses. The subject of the investigation should be selected, in consultation with the head of the Department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

250. HIGHWAY ENGINEERING I LABORATORY. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Applied Mechanics II Laboratory. Assistant Professor Wendt. This is a comprehensive course in the examination and testing of bituminous and non-bituminous road materials.

COURSES IN DRAWING AND MACHINE DESIGN

FOR UNDERGRADUATES

155. ENGINEERING DRAWING. Freshman year, both semesters and summer school. Drafting, supplemented by lectures and recitations, six hours. Two semester credits. Assistant Professor Pearce, Instructor ———, and assistants.

Instruction is given in the selection and use of drawing instruments, construction of geometrical figures, lettering, orthographic projections, and pictorial methods of representation. Text: French's *Engineering Drawing*.

158. DESCRIPTIVE GEOMETRY. Freshman year, both semesters and summer school. Drafting practice with lectures and recitations, six hours. Two semester credits. Prerequisite: Engineering Drawing. Assistant Professor Pearce, Instructor ———, and assistants.

In this course, which is a continuation of Engineering Drawing, more advanced problems, involving the point, line, and plane; the intersection and development of the surfaces of geometric solids; single-curved, double-curved and warped surfaces, with their sections, tangents and tangent planes, as well as the practical applications of the principles involved, are studied. Emphasis is laid on developing the student's ability to visualize drawings in the third angle.

161. MECHANICAL DRAWING I. Freshman and sophomore years, both semesters and summer school. Drafting, with lectures and recitations, six hours. Two semester credits. Prerequisite: Descriptive Geometry. Professor Seaton, Assistant Professor Pearce, and Instructor ———.

A study is made of conventional representations, working drawings, modern drafting room systems, and the reproduction of drawings. Additional practice is given in the inclined Gothic and Reinhardt systems of lettering. Working drawings, both detail and assembly, are made from assigned plates. Special emphasis is given to the proper selection of views to present the necessary information in convenient forms, dimensioning, checking for errors, and the subject matter and arrangement of titles and notes. Text: French's *Engineering Drawing*.

170. MECHANICAL DRAWING II. Sophomore and junior years, second semester and summer school. Drafting, nine hours. Three semester credits. Prerequisites: Mechanical Drawing I (Ap. Mech. 16). Kinematics (Ap. Mech. 180) must accompany or precede this course. Professor Seaton, Assistant Professor Pearce, and Instructor ———.

About one-half of the time is occupied in making free-hand sketches of simple machine and complete working drawings from these sketches without further reference to the objects. At least one drawing is traced, and a blue print made from the tracing. The remainder of the semester is devoted to kinematic problems, including belting, cams, linkages and gears to fulfill specified conditions. Center line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Displacement and velocity diagrams are drawn for linkages and cams.

175. MECHANICAL DRAWING III. Junior year, first semester. Drafting, three hours. One semester credit. Prerequisite: Mechanical Drawing II (Ap. Mech. 170). Steam and Gas Engineering I (Steam and Gas 101) must accompany or precede this course. Professor Seaton and Assistant Professor Pearce.

This includes the solution of a problem on the slide valve by the Zeuner diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. Kent's *Mechanical Engineers' Pocketbook* and Mark's *Mechanical Engineers' Handbook* are extensively used for reference, and each student is expected to have a copy of one of these books.

180. KINEMATICS. Sophomore and junior years, both semesters and summer school. Lectures and recitations, three hours. Three semester credits. Prerequisites: Plane Trigonometry (Math. 101) and Descriptive Geometry (Ap. Mech. 158). Professor Seaton, Assistant Professor Pearce, and Instructor ———.

An analysis of the motions and forms of the parts of machines. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cords and chains; levers, cams and linkwork, with velocity and motion diagrams; quick returns, straightline motions, and other special forms of linkages; gearing and combinations of mechanisms. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

FOR GRADUATES AND UNDERGRADUATES.

201. MACHINE DESIGN I RECITATION. Senior year, first semester. Lectures and recitations, three hours. Three semester credits. Prerequisites: Applied Mechanics II and Mechanical Drawing II (Ap. Mech. 110, 170); Steam and Gas Engineering II (Steam and Gas 110). Must accompany Machine Design I Laboratory (Ap. Mech. 205). Professor Seaton and Assistant Professor Pearce.

A study is made of the straining actions in machine elements in general, with special attention to the design of springs, riveted fastenings, screw fastenings, key, force fits, tubes, plates, journals, bearings, shafting, couplings, and belt, rope, chain and gear transmissions. Some time is devoted to a study of friction and lubrication, to the action of reciprocating parts in engines, and to the problems arising in the design of high-speed machinery. Text: Kimball and Barr's *Elements of Machine Design* and Lanza's *Dynamics of Machinery*.

205. MACHINE DESIGN I LABORATORY. Senior year, first semester. Drafting, six hours. Two semester credits. Must accompany Machine Design I Recitation (Ap. Mech. 201). Professor Seaton and Assistant Professor Pearce.

A steam boiler is designed in strict conformity to the A. S. M. E. *Boiler Code*. Calculations are made for all parts except standard fittings, and working drawings are made. In the latter part of the course designs are made for a large pulley, shaft and shaft coupling.

210. MACHINE DESIGN II. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisites: Machine Design I (Ap. Mech. 201, 205). Professor Seaton and Assistant Professor Pearce.

This is a continuation of Machine Design I Laboratory. A small power shear is designed. Calculations are made for all parts.

215. FLOUR-MILL DESIGN. Senior year, first semester. Drafting, six hours, supplemented by lectures and assigned reading. Two semester credits. Prerequisites: Applied Mechanics E-II (Ap. Mech. 115) and Milling Practice I (Mill. Ind. 201). Professor Seaton and Mr. ———.

A design is made for a medium capacity flour mill, including the selection and the planning of the arrangement of the machinery.

Architecture

Professor BAKER
Professor WALTERS (Emeritus)
Instructor SMITH

The courses in architecture are offered not only to provide for the fundamental training necessary for the practice of architecture, but also to give the student a facility and working knowledge which will be of immediate value to him upon graduation. The foundation which the student acquires in college should be supplemented by continual professional study, especially during those years immediately following graduation, when it is desirable that he should acquire practical experience in the employ and under the guidance of capable and experienced members of the profession. Students are most urgently advised to acquire practical experience in an architect's office during the summer vacations of their college course.

Throughout the course the instruction by lectures, recitations and drafting-room practice is fully amplified and expanded by a free use of the equipment of the Department of Architecture. Within the Department is housed a good working library of the standard architectural works and leading professional magazines, together with the collections of lantern slides and photographs, to all of which the student has free access. Placed about the amply lighted and well-equipped rooms of the Department is a generous collection of plaster casts, including important examples of architectural fragments and ornament from historical monuments. On the walls of the drawing rooms, where they are constantly before the student, are hung selected examples from the Department's collection of original drawings, including specimens of both academic and current professional work. From time to time this exhibit is changed.

At frequent intervals representative men actually engaged in the practice of architecture and the allied arts and trades are invited to talk to and to advise the students. During the junior or senior year, under the direction of and in company with a member of the departmental faculty, each student is expected to make a visit to one or more of the neighboring cities, thus enabling him to acquaint himself with the representative work of the profession as well as with the operations and processes involved in the conduct of allied professions and industries.

All drawings or designs made during the student's course are to become the property of the Department, to be used or returned at the discretion of the faculty.

COURSES IN ARCHITECTURE

FOR UNDERGRADUATES

108. ARCHITECTURAL DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credits. Professor Baker and Mr. Smith.

This course is outlined to give the student a working knowledge of architectural drafting-room practice, with a view to fitting him to enter an architect's office his first summer in college. The work covers the

different methods of presenting architectural drawings, lettering, and the various symbols used in architectural practice. Special attention is given to the study of fundamental forms and their presentation.

109. ARCHITECTURAL DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Course 108. Professor Baker and Mr. Smith.

This is a continuation of Architectural Drawing I, and consists of a more detailed study of architectural forms, in preparation for Design I in the sophomore year. Text: Pierre Esquire's *Traite Elementaire d'Architecture Comprenant l'Etude Complete des Cinq Ordres*.

111. FREE-HAND DRAWING I. Freshman year, first semester. Drafting room, six hours. Two semester credits. Professor Baker.

This course comprises the drawing of simple objects and groups as exercises in developing the powers of observation as well as in training the hand. Special attention is given to representations of the third dimension. The Cross drawing glass is used as an aid during the earlier weeks of the course.

114. FREE-HAND DRAWING II. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 111. Professor Baker.

This is an amplification and expansion of the principles taught in Free-hand Drawing I, as applied to architectural forms and architectural ornament. The work consists of drawing in charcoal or pencil from casts.

116. FREE-HAND DRAWING III. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 114. Professor Baker.

This is a continuation of Free-hand Drawing II, and consists of drawing from casts of architectural ornament and of the human figure, with occasional exercises in rapid sketching.

117. FREE-HAND DRAWING IV. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 116. Professor Baker.

In this course Free-hand Drawing III is continued.

118. FREE-HAND DRAWING V. Junior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 117. Professor Baker.

This is a continuation of Free-hand Drawing III and IV, and consists of a more detailed study and rendering in charcoal of architectural ornament and the human figure. More time is given than in the previous course to rapid sketching in pencil and pen and ink, as well as to drawing from memory.

120. FREE-HAND DRAWING VI. Junior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 118. Professor Baker.

In this course Free-hand Drawing V is continued.

121. FREE-HAND DRAWING VII. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 120. Professor Baker.

This is a continuation of Free-hand Drawing V and VI, but gives more time to the drawing of the human figure and to practice in original composition, as well as to sketching in water color.

123. FREE-HAND DRAWING VIII. Senior year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 121. Professor Baker.

In this course Free-hand Drawing VII is continued.

127. PERSPECTIVE. Freshman year, first semester. Drafting room, six hours. Two semester credits. To be taken simultaneously with Ap. Mech. 155 and Arch. 108. Mr. Smith.

This course, consisting of drafting-room exercises and examinations, covers the study and practical application of the theory of perspective as related to architectural practice. In the latter part of the course drafting-room exercises are given to train the student to visualize in perspective objects represented in orthographic projection.

130. SHADES AND SHADOWS. Freshman year, second semester. Drafting room, six hours. Two semester credits. Prerequisites: Ap. Mech. 155, and Arch. 108, 127. To be taken simultaneously with Ap. Mech. 158 and Arch. 109. Mr. Smith.

The course consists of a series of drafting-room exercises and examinations, applying the principles of descriptive geometry in casting conventional architectural shadows. In these exercises the student is required to give careful consideration to the elemental architectural forms and principles of rendering used in his study of this subject. Text: McGoodwin's *Architectural Shades and Shadows*.

135. MATERIALS OF CONSTRUCTION I. Freshman year, first semester. Class work, two hours. Two semester credits. Mr. Smith.

This is a recitation course covering the study of the properties and uses of the various building materials, together with the conditions and limitations under which they may be used in different types of building construction. Text: Kidder's *Building Construction and Superintendence*, Vols. I and II.

138. MATERIALS OF CONSTRUCTION II. Freshman year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 135. Mr. Smith.

In this course Materials of Construction I is continued.

142. DESIGN I. Sophomore year, first semester. Drafting room, nine hours. Three semester credits. Prerequisites: Arch. 114, 126, and 129. Professor Baker.

This course is outlined to develop the student's understanding of architectural composition and his ability to present architectural conceptions, thus laying the foundation for his esthetic training. By means of problems in original design, accompanied by a constant study and analysis of the best historical examples, the student is led to develop his sense of proportion and conception of beauty, at the same time acquiring through the training of hand and eye a facility in architectural composition and rendering. In this course each student receives individual instruction, accompanied by frequent criticisms of students' work before the entire class.

144. DESIGN II. Sophomore year, second semester. Drafting room, nine hours. Three semester credits. Prerequisite: Arch. 142. Professor Baker.

In this course Design I is continued.

145. DESIGN III. Junior year, first semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 117 and 144. Professor Baker.

This is a continuation of Design I and II. At frequent intervals during the year time problems or rapid design sketches are required to test the student's development and to give him practice in clear and concise expression. It is also required that at least one problem be presented in perspective.

147. DESIGN IV. Junior year, second semester. Drafting room, fifteen hours. Five semester credits. Prerequisites: Arch. 145. Professor Baker.

In this course Design III is continued.

148. DESIGN V. Senior year, first semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisites: Arch. 120 and 147. Professor Baker.

In this course Design IV is continued.

151. DESIGN VI. Senior year, second semester. Drafting room, twenty-four hours. Eight semester credits. Prerequisite: Arch. 148. Professor Baker.

In this course Design V is continued.

153. HISTORY OF ARCHITECTURE I. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 114. Mr. Smith.

This is a lecture and recitation course covering the history of architecture from the dawn of civilization to the end of the Hellenistic age. Throughout the courses in the history of architecture the relation of architecture to the development of civilization is constantly emphasized. The lectures are given with the aid of lantern slides, and written papers, with sketches, are required of each student.

156. HISTORY OF ARCHITECTURE II. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 153. Mr. Smith.

This course continues History of Architecture I and covers the period from the end of the Hellenistic age to the end of the Roman Empire.

159. HISTORY OF ARCHITECTURE III. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Arch. 117 and 156. Mr. Smith.

This course continues History of Architecture II and covers the period from the end of the Roman Empire to the Renaissance.

161. HISTORY OF ARCHITECTURE IV. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Arch. 159. Mr. Smith.

This course continues History of Architecture III and covers the period from the dawn of the Renaissance to modern times.

168. WORKING DRAWINGS AND SPECIFICATIONS I. Sophomore year, first semester. Drafting room, six hours. Two semester credits. Prerequisites: Ap. Mech. 158, Arch. 109 and 138. Professor Baker and Mr. Smith.

This is a course designed to give the student experience in the execution of working drawings as required in actual practice, together with a simultaneous study of the specifications that must accompany such drawings. Special emphasis is laid upon the uses of various building materials and their influence upon architectural design. From time to time the class visits buildings under construction as well as the offices of successful practicing architects.

169. WORKING DRAWINGS AND SPECIFICATIONS II. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Arch. 168. Professor Baker and Mr. Smith.

In this course Working Drawings and Specifications I is continued.

172. DOMESTIC ARCHITECTURE. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisites: Arch. 144 and 169. Professor Baker.

This is a course of drafting-room exercises covering the history and

development of the modern house. Following a historical survey a study is made of the problems of location, plan, and design; types of construction, systems of sanitation, heating, and lighting. Throughout the course the student, along with the study of plans and designs and actual visits to houses, is required to solve problems.

183. CIVILIZATION AND ART I. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisites: Hist. 123 and Arch. 156. Professor Baker.

This course comprises a survey of civilization from earliest history, laying special emphasis on the Hellenistic, Roman and Gothic periods, and tracing the economic, political, racial and religious phases of history simultaneously with the artistic developments of each epoch. The course consists of lectures, recitations, written papers and research, the accomplishment of which is greatly aided by a free use of lantern slides, photographs, and library references.

185. CIVILIZATION AND ART II. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Arch. 183. Professor Baker.

This continues Civilization and Art I to the close of the Renaissance.

191. OFFICE PRACTICE. Senior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Senior standing. Professor Baker.

This course is designed to acquaint the student with the relations between the architect and the contractor, the client, the building trades, the recognized architectural societies, and the community. The problems of building laws, labor laws, contracts and bonds are also discussed. The work includes lectures, recitations, research, and reports.

Civil Engineering

Professor CONRAD
Assistant Professor FRAZIER
Instructor FUER
Instructor WHITE

The instruction in civil and highway engineering is given by means of lectures and recitations, and by the practice in the field, in the drafting room, and in the laboratory. The heaviest technical work of the Department falls in the junior and senior years, during which courses are given in civil engineering drawing and in the analysis of stresses in framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railways, highway engineering, astronomy, and geodesy. Considerable time is devoted to thesis work.

The seminar affords the students an opportunity to become acquainted with modern engineering practice through discussions and references to current periodicals.

In addition to the laboratory equipment found in other engineering departments, which is available to civil engineering students as well, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains. It also owns a precise level, a direction theodolite, a repeating theodolite, a base-line outfit. A recording gauge makes a continuous record of the stage of the Kansas river, to be

used in computing the flood discharge of that stream. This information will be of great value in future years as a basis for designing works for flood protection.

COURSES IN CIVIL ENGINEERING

FOR UNDERGRADUATES

102. SURVEYING I. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Plane Trigonometry (Math. 101). Assistant Professor Frazier, Mr. Furr and Mr. White.

This is a brief course in the use and care of engineers' surveying instruments. Text: Vol. I, Breed and Hosmer's *Surveying*.

111. SURVEYING II. Freshman year, both semesters. Field work, plotting and supervised study, six hours. Two semester credits. Prerequisite: Surveying I. Mr. Furr and Mr. White.

The course is devoted to work in land and topographic surveying. Text: Vol. I, Breed and Hosmer's *Surveying*.

120. MASONRY AND FOUNDATIONS. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Engineering Physics I (Physics 211). Professor Conrad.

A course devoted to a study of the principles underlying the design and construction of foundations, the stresses in plain masonry structures, and the method of designing such structures.

125. CIVIL ENGINEERING DRAWING I. Sophomore year, second semester. Drafting room, six hours. Two semester credits. Prerequisite: Mechanical Drawing I (Ap. Mech. 160, 165). Assistant Professor Frazier.

A course devoted to the application of stereotomy, shades and shadows, isometric drawing, and perspective and copying working drawings of engineering structures. The principles are explained to the students by such short lectures as seem necessary for the purpose. No textbook is used.

130. ELEMENTS OF IRRIGATION AND DRAINAGE RECITATION. Elective, first semester. Class work, two hours a week for the first half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

This course comprises a brief treatment of the subjects from the agriculturist's point of view. Texts: Elliott's *Engineering for Land Drainage*, and Fortier's *Use of Water in Irrigation*.

135. ELEMENTS OF IRRIGATION AND DRAINAGE LABORATORY. Elective, first semester. Field work, six hours a week for the second half of the semester. One semester credit. No prerequisite. Assistant Professor Frazier.

Practice work in the field and drafting room is devoted to the laying out and plotting of simple form drainage and irrigation systems. Same texts as in C. E. 130.

145. RAILWAY ENGINEERING I. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisites: Surveying II and Civil Engineering Drawing I (C. E. 111, 125). Assistant Professor Frazier.

This is a short course in the theory of railway engineering based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and to the design of yards and terminals. Texts: Raymond's *Elements of Railroad Engineering*.

151. SURVEYING III RECITATION. Sophomore year, first semester. Class work, two hours. Two semester credits. Prerequisite: Surveying II. Mr. Furr.

This course comprises a study of hydrographic, city and mine surveying, Text: Breed and Hosmer's *Surveying*, Vols. I and II.

155. SURVEYING III LABORATORY. Sophomore year, first semester. Field and drafting-room work, three hours. One semester credit. Prerequisite: Surveying II Laboratory. Mr. Furr.

The field exercises are devoted to practice work in topographic surveying. Time in the drafting room is devoted principally to topographic mapping. Texts same as in C. E. 151.

156. SURVEYING IV. RECITATION. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Surveying III. Mr. Furr.

This course is devoted to a study of railroad curves and earth-work.

157. SURVEYING IV LABORATORY. Sophomore year, second semester. Field and drawing room, three hours. One semester credit. Prerequisite: Surveying II. Mr. Furr.

The time is devoted to field and drafting room exercises in railroad curves and earth-work.

161. DRAINAGE AND IRRIGATION I. Junior year, second semester. Class work, two hours. Two semester credits. Hydraulics (Ap. Mech. 130) must be taken with this course or precede it. Professor Conrad.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground-water supplies for irrigation. Texts: Elliott's *Engineering for Land Drainage*, and Newell and Murphy's *Principles of Irrigation Engineering*.

170. THESIS. Senior year, continuing through both semesters. Professor Conrad. All candidates for the degree of bachelor of science in civil engineering are required, during their senior year, to prepare a thesis. This thesis may be a report on a proposed design, an original investigation, or a library research. Civil engineering students may, with the approval of the head of the Department, take their thesis work outside of the Department. The thesis subject may be selected and approved by the head of the Department in which the work is done before October first next preceding the commencement at which the candidate proposes to graduate.

FOR GRADUATES AND UNDERGRADUATES

201. BRIDGE STRESSES. Senior year, first semester. Class work, four hours. Four semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

This course involves a study of the algebraic and graphical methods of computing the stresses in bridges, leading up to the subject of bridge design in the following semester. Text: Merriam and Jacoby's *Roofs and Bridges*, Part I.

205. CIVIL ENGINEERING DRAWING II. Senior year, first semester. Drafting room, six hours. Two semester credits. Prerequisite: Civil Engineering Drawing I (C. E. 125). Professor Conrad.

This course is devoted to graphic statics and the design of simple roof trusses in timber and steel. Text: Merriman and Jacoby's *Roofs and Bridges*, Part II.

210. ASTRONOMY AND GEODESY RECITATION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Surveying III. Assistant Professor Frazier.

A brief course in the elements of practical astronomy followed by a study of the precise methods of surveying and leveling. Text: Breed and Hosmer's *Surveying*, Vol. II.

215. ASTRONOMY AND GEODESY LABORATORY. Senior year, first semester. Field work, three hours. One semester credit. Prerequisite: Surveying III Laboratory. Assistant Professor Frazier.

The work is devoted to simple astronomical observations, principally for determining the true meridian; to base line measurements and triangulation work. Each student will also be required to run a short circuit with the precise level.

220. WATER SUPPLY. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Professor Conrad.

The course deals with the water supply for cities from the standpoints of consumption, collection, storage, distribution, and purification.

225. SEWERAGE. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Hydraulics (Ap. Mech. 130). Assistant Professor Frazier.

A study is made of the problems met in the design and construction of sewer systems and disposal plants for cities of moderate size. Text: Folwell's *Sewerage*.

230. HIGHWAY ENGINEERING I RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Mr. Furr.

A study of the principles underlying the location, construction and maintenance of all ordinary types of roads and pavements. Text: Ogg's *Construction of Roads and Pavements*. (For the laboratory work in connection with this course, see Ap. Mech. 250.)

246. BRIDGE DESIGN LABORATORY. Senior year, second semester. Drawing, nine hours. Three semester credits. Prerequisite: Bridge Stresses (C. E. 201). Bridge Design (C. E. 240) must accompany this course. Professor Conrad.

This course comprises general drawings for a highway truss bridge, a railroad truss bridge and a railroad deck plate girder. Text: Merriam and Jacoby's *Roofs and Bridges*, Part III.

250. CONCRETE DESIGN RECITATION. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

An application of the principles of reinforced concrete to the design of chimneys, buildings, retaining walls, dams and bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

255. CONCRETE DESIGN LABORATORY. Senior year, second semester. Drafting-room work, three hours. One semester credit. Prerequisite: Applied Mechanics II (Ap. Mech. 110). Professor Conrad.

In this course the students make drawings of reinforced concrete retaining walls, dams, slab and girder bridges and arch bridges. Text: Taylor and Thompson's *Concrete, Plain and Reinforced*.

260. RAILWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Eng. 145). Assistant Professor Frazier.

This course comprises the study of railway operation and maintenance.

265. RAILWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Railway Engineering I (Civ. Eng. 145). Assistant Professor Frazier.

In the field, reconnaissance and survey of a short railroad is made, and the office work consists in making the maps, profiles and estimates from the survey. Text: Allen's *Railroad Curves and Earthwork*.

270. HIGHWAY ENGINEERING II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Eng. 230). Mr. Furr.

This course consists in a study of highway laws, highway administration in the various states, and highway economics.

275. HIGHWAY ENGINEERING II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Prerequisite: Highway Engineering I (Civ. Eng. 230). Mr. Furr.

In the field, a reconnaissance and survey for a highway a few miles long is made. The work in the drafting room consists in making the maps, profiles and estimates from the survey.

280. DRAINAGE AND IRRIGATION II RECITATION. Optional, senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Drainage and Irrigation I. Professor Conrad.

A continuation of the former course in Drainage and Irrigation, dealing with the design of irrigation structures and the management of irrigation projects.

285. DRAINAGE AND IRRIGATION II LABORATORY. Optional, senior year, second semester. Field and drafting room, six hours. Two semester credits. Professor Conrad.

The field work consists in making the survey for a drainage or irrigation project. In the office the maps, estimates and designs will be made, using the survey as a basis.

Electrical Engineering

Professor REID
Assistant Professor KLOEFFLER
Instructor MARKLE
Instructor _____

Instruction in this department is given by means of textbooks, lectures, reference work, and laboratory periods. The class work is carefully illustrated by means of demonstration apparatus and the projection lantern.

The electrical laboratory for the work of the third year is provided with standard instruments of measurements, including standards of resistance, self-induction, capacity, etc. A complete line of standard makes of ammeters, voltmeters, wattmeters, and galvanometers is also provided. The different laboratories of the department are supplied with electric current from the following sources: 120-volt storage-battery circuit; 110-volt direct-current circuit; 110-volt alternating-current circuit; 220-volt direct-current circuit. Voltages up to 60,000 can be produced in the dynamo laboratory for testing purposes.

The modern equipment contained in the telephone laboratory has been made possible through the liberal coöperation of various telephone companies. It includes a Western Electric demonstration panel, containing

all parts and circuits for connecting two subscribers through the A board and B board of the multi-office exchange; a Swedish-American magneto wall switchboard; a demonstration outfit of the Automatic Telephone Company type, including line switches, first and second selectors and connector switches; Kellogg Switchboard & Supply Company's switchboard panel, and two demonstrating panels of the Stromberg-Carlson type, one containing all the parts and circuits for the magneto switchboard and the other the same for common battery board. A complete line of bridging magneto and common battery wall telephone sets of all above-mentioned makes, including two of Leigh Cracraft type, will be found in the laboratory. In addition there are series telephone sets, desk telephones, various individual telephone parts and potentiometer boards, etc., for making transmission efficiency tests.

The electrical engineering laboratory is provided with a number of standard commercial machines, among them a 30-kilowatt 2,300-volt polyphase alternating-current generator, a 15-kilowatt 125-volt alternating-current generator, which may be connected as a single-phase, two-phase, three-phase, six-phase or twelve-phase machine; a $7\frac{1}{2}$ -kilowatt synchronous converter, which may be used as a one-, two-, three-, or four-phase motor; single- and three-phase induction motors; a 5-horsepower phase wound induction motor; a 20-horsepower auxiliary pole 220-volt direct-current motor, with a speed range from 250 to 1,000 R. P. M.; a 20-horsepower 220-volt direct-current motor; a 15-kilowatt direct-current generator, a Wood arc machine, a $4\frac{1}{2}$ -kilowatt 125-volt direct-current generator and several smaller machines; a 60-cell 160-ampere-hour storage battery, current transformers, arc lamps, constant potential transformers, 20,000- and 60,000-volt testing transformers, marble and slate switchboards, a Tirrel regulator, speed controllers, and a full line of ammeters, voltmeters, wattmeters, etc., for testing purposes.

Recent additions to the laboratory include a 3-movement oscillograph with photographing attachments, with which simultaneous waves of three quantities may be observed and photographed; and a phase-changing set consisting of two $7\frac{1}{2}$ -kilowatt alternating-current generators and two 15-horsepower direct-current motors, speed variable from 600 to 1,800 revolutions per minute. All four machines are mounted on the same bed-plate, and by means of flanged couplings can be run in any combination of two, three or four machines. The generator armature windings are brought out to twelve terminals and may be connected for single-, two- and three-phase Y, or delta six-phase and twelve-phase, and when running in synchronism the armatures of the two machines may be turned, with reference to each other, through 180 degrees, so that any phase difference that is desired may be obtained. The generators may be used in parallel, as synchronous motors, and in any other desired combinations.

The equipment includes also two compound-wound direct-current generators on the same sub-base, to illustrate generators in parallel operation. Edison 3-wire system, "pump-back" factory efficiency tests, etc.; a 10 kw. special rotary converter, designed for use in single-, three-, or six-phase operation, having amortisseur winding, speed-limiting and oscillating devices and commutating poles. Three 5 kw. transformers are ac-

cessories of this machine. A pair of 6 kw. compound-wound generators is used to furnish the laboratory with a 110-220-volt 3-wire system from the 220-volt lines supplied by the power plant, and to illustrate commercial use of such systems. The Electric Controller and Manufacturing Company, of Cleveland, have donated a valuable automatic motor starter and controller, such as is used with motors driving machine tools.

Through the generous assistance of the Westinghouse Electric and Manufacturing Company, the department has been able to install a very complete electric railway test set, consisting of two street-railway motors of a most recent design and a complete control equipment of the H L type. The motors are mounted on and geared to a shaft, on which are a flywheel and brake pulley. The flywheel requires as much energy to accelerate as does a 10-ton car, and the brake load may be adjusted to reproduce any desired load on car and condition of track. The H L control equipment includes the master controller, and electrically controlled, air-operated unit switches. It is the type used on many single cars and multiple-car trains on surface, elevated and subway roads, and also in many of the modern steam road electrifications.

COURSES IN ELECTRICAL ENGINEERING

FOR UNDERGRADUATES

101. DIRECT-CURRENT MACHINES I RECITATION. Junior year, first semester. Recitations or lectures, three hours. Three semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Professor Reid.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coordinate with the work in the electrical engineering laboratory. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

105. DIRECT-CURRENT MACHINES I LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines I Recitation. Assistant Professor Kloeffer.

A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit, and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies. Text: Swenson and Frankenfield's *Testing of Electro-magnetic Machinery*, Vol. I.

110. DIRECT-CURRENT MACHINES II RECITATION. Junior year, second semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Direct-Current Machines I. Assistant Professor Kloeffer.

This course is a continuation of Direct-current Machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

The latter part of the course is devoted to a study of the construction and testing of the various types of voltmeters, ammeters, wattmeters, and watt-hour meters. Text: Jansky's *Electrical Meters*.

115. DIRECT-CURRENT MACHINES II LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Direct-Current Machines II Recitation. Assistant Professor Kloeffer.

Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results. The latter part of the course is devoted to the calibration of electrical instruments. Text: Swenson and Frankenfield's *Testing of Electromagnetic Machinery*, Vol. 1.

121. ELECTRICAL MEASUREMENTS RECITATION. Junior year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Text: A. W. Smith's *Principles of Electrical Measurements*. Assistant Professor Kloeffer.

This course is an extension of the work in electricity in Engineering Physics II. It treats of the various methods for the measurement of resistance, current, electro-motive force, capacity and inductance.

126. ELECTRICAL MEASUREMENTS LABORATORY. Junior year, first semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Electrical Measurements Recitation. Assistant Professor Kloeffer.

The laboratory course follows the work of the classroom by giving applications of the fundamental principles studied.

130. ELECTRICAL ENGINEERING M-I RECITATION. Senior year, first semester. Lectures or recitations, three hours. Three semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus II (Math. 116). Mr. Markle.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit, the principles of direct-current machinery, and the more important commercial tests. Text: Bailey's *Dynamo-Electric Machinery*.

135. ELECTRICAL ENGINEERING M-I LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Electrical Engineering M-I Recitation. Mr. Markle.

Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristics and efficiency tests are given. A written report on each test is required.

140. ELECTRICAL ENGINEERING M-II RECITATION. Senior year, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Electrical Engineering M-I. Professor Reid.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text: Bailey's *Dynamo-Electric Machinery*.

145. ELECTRICAL ENGINEERING M-II LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Professor Reid.

This course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers; and methods of operating the different types of alternating-current machinery.

150. ELECTRICAL MACHINE DESIGN I. Senior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Direct-current Machines II. Assistant Professor Kloeffer.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator. Text: Gray's *Electrical Machine Design*.

155. ELECTRICAL MACHINE DESIGN II. Senior year, second semester. Laboratory, six hours. Two semester credits. Prerequisites: Alternating-current Machines II, and Electrical Machine Design I. Assistant Professor Kloeffer.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine. Text: Gray's *Electrical Machine Design*.

160. ELECTRICAL ENGINEERING C RECITATION. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: College Physics. Mr. Markle.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current electricity. Emphasis is laid upon the proper installation and operation of the different classes of machines, and the use of electricity for lighting and power. Text: Morecroft's *Continuous and Alternating Machines*.

165. ELECTRICAL ENGINEERING C LABORATORY. Senior year, second semester. Laboratory work, three hours. One semester credit. Assistant Professor Kloeffer.

The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of electrical instruments is emphasized. A written report of each laboratory test is required.

170. ELECTRICAL MACHINERY AND CONSTRUCTION. Freshman year, first and second semesters. Laboratory work, six hours. Two semester credits. Professor Reid and Mr. Markle.

This is an introductory course in applied electricity. About one-half the time is devoted to acquainting the student with the various modern methods of interior wiring, approved by the National Board of Fire Underwriters, including open, cleat wiring, knob and tube-concealed wiring, flexible and rigid iron-pipe conduit, and metal molding. The wiring "code" is used as a reference in this part of the course, and on its completion the student should be competent to plan, lay out and install the wiring for the usual residence or business building.

The remainder of the time is devoted to the installation, care, operation and repair of electrical machinery. It includes armature winding of direct- and alternating-current motors and generators; the diagnosis and location of faults—short circuits, open circuits, grounds—and the repair of these various types of electrical machine troubles. It also includes the installation and connection of motors, generators, meters, compensators, and other of the usual types of electrical apparatus.

195. THESIS. Senior year, continuing through both semesters. Professor Reid, Assistant Professor Kloeffer, and Mr. Markle.

The subject for thesis work is selected in consultation with the head of the department, at the beginning of the first semester of the senior year. The work is continued during the second semester. Every opportunity is given the student to work out original ideas as to design and operation of electrical apparatus and machinery.

FOR GRADUATES AND UNDERGRADUATES.

201. ALTERNATING-CURRENT MACHINES I RECITATION. Junior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisites: Calculus II (Math. 116) and Direct-Current Machines II. Professor Reid.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol II.

205. ALTERNATING-CURRENT MACHINES I LABORATORY. Junior year, second semester. Laboratory work, three hours. One semester credit. This course should accompany or follow Alternating-Current Machines I Recitation. Professor Reid.

It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

210. ALTERNATING-CURRENT MACHINES II RECITATION. Senior year, first semester. Recitations or lectures, four hours. Four semester credits. Prerequisite: Alternating-Current Machines I. Professor Reid.

This is a continuation of Alternating-Current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Text: Franklin and Estey's *Elements of Electrical Engineering*, Vol. II.

215. ALTERNATING-CURRENT MACHINES II LABORATORY. Senior year, first semester. Laboratory work, six hours. Two semester credits. This course should accompany or follow Alternating-Current Machines II Recitation. Professor Reid.

A series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

220. TELEPHONY RECITATION. Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Calculus II (Math 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffer.

This course consists of a consideration of the principles of acoustics and alternating-current phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text: McMeen and Miller's *Telephony*.

225. TELEPHONY LABORATORY. Senior year, first semester. Laboratory, three hours. One semester credit. This course should accompany or follow Telephony Recitation. Assistant Professor Kloeffer.

This course includes the study and measurement of telephone parts, the actual wiring of telephone circuits on the magneto, common battery and automatic systems, location of line trouble and transmission efficiency tests on various types of apparatus and circuits.

235, 236. ILLUMINATING ENGINEERING. Senior year, second semester. Lectures and recitation, two hours; laboratory, three hours: Three semester credits. Prerequisites: Calculus II (Math. 116) and Engineering Physics II (Physics 212). Assistant Professor Kloeffer.

This course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied. Text: Croft's *Practical Electric Illumination*.

240. ELECTRIC RAILWAYS. Senior year, second semester. Recitations or lectures, two hours. Two semester credits. Prerequisite: Alternating-current Machines II (Elect. Eng. 210). Professor Reid.

A study is made of the development of electric traction; traffic conditions and train schedules; speed-time curves; power generations and distribution for electric railways; signal systems; types of cars and locomotives in use; various control systems; and adaptability of electric traction to steam roads. Text: Harding's *Electric Railway Engineering*.

Farm Engineering

Professor EKBLAW
Assistant Professor SANDERS
Assistant Professor KERN
Assistant SMITH

This department gives instruction in such branches of engineering as are directly related to agriculture. It also correlates and gives general supervision to such courses presented in other engineering departments as are open to students in agriculture and agricultural engineering, in order that the agricultural application and uses of engineering principles, methods, and materials may be kept clearly before the student.

In all the courses given the time is carefully apportioned between the classroom and the laboratory, in order to present the subject in the clearest and most forceful way. The practical application of theoretical principles is emphasized.

The various courses in rural architecture, farm machinery, and tractors, are under the direct supervision of this department. The student is taught the requirements of farm buildings, is trained to plan their arrangement, and to select and use the proper construction materials in the most advantageous way. The farm machinery laboratory equipment is unusually ample and complete; all kinds of the most modern implements, to the value of nearly \$10,000, are available, whereby their construction, adjustment, operation, and care may be fully covered, not only in laboratory study, but in field work and draft tests as well. The study of traction engines is arranged to cover thoroughly the construction, operation and repair of the numerous modern tractors, which are part of the regular equipment; traction tests in conjunction with various types of farm power machinery are also made. The tractor laboratory is also equipped with four tractor power units mounted on bases, with various types of tractor ignition apparatus, and with complete apparatus for power and draft tests. All farm machinery and tractor equipment is kept up to date through a system of exchange with the manufacturers

whereby old machines are replaced, when advisable, by new ones. During the College year 1918-19, there were twenty-seven gas and steam tractors in use in the tractor laboratory.

The comparatively recent development of this work and its rapidly growing importance, renders investigational study very valuable and special attention is given to the courses covering this phase of the subject.

COURSES IN FARM ENGINEERING

FOR UNDERGRADUATES

102. RURAL ARCHITECTURE. Elective, both semesters. Lectures, recitations, drafting-room practice, nine hours. Three semester credits. Professor Ekblaw.

This course includes lectures on the requirements, details of arrangement, and materials of construction for barns, storage and work buildings for the farm. The preparation of specifications, bills of material and estimates of costs is an essential part of the course. In the drafting-room plans are prepared for typical farm buildings.

106. FIELD MACHINERY RECITATION. Sophomore year and elective, both semesters. Class work, one hour. One semester credit. Professor Ekblaw and Assistant Professor ———.

The fundamentally important definitions and principles relating to farm machinery are first given, this being followed by material concerning the development, construction, operation and use of soil preparation, seeding, cultivating, harvesting and miscellaneous machinery. The importance of proper selection and care of farm machinery is emphasized.

107. FIELD MACHINERY LABORATORY. Sophomore year and elective, both semesters. Laboratory, three hours. One semester credit. Assistant Professor ———.

A detailed study of the machines taken up in the classroom is conducted in the laboratory and in the field.

111. POWER MACHINERY RECITATION. Junior year and elective, second semester. Class work, one hour. One semester credit. Prerequisite: Field Machinery. Professor Ekblaw and Assistant Professor ———.

This course continues the study of field machinery with special reference to those machines requiring mechanical power for their operation, including engine plows, hay balers, feed mills, corn shellers, ensilage cutters, and threshing machines.

112. POWER MACHINERY LABORATORY. Junior year and elective, second semester. Laboratory, three hours. One semester credit. Assistant Professor ———.

Laboratory and field instruction is given and tests are conducted upon the machines discussed in the classroom.

116. TRACTORS AND TRUCKS RECITATION. Junior year, both semesters. Lectures and recitations, two hours. Two semester credits. Prerequisite: None. Assistant Professor Sanders.

This course covers the study of the construction and operation of tractors and trucks, with special reference to machines using internal combustion engines as power units.

117. TRACTORS AND TRUCKS LABORATORY. Junior year, both semesters. Laboratory, three hours. One semester credit. Assistant Professor Sanders and assistants.

A study is made of the construction of steam and gas tractors and trucks and practice is given in the operation and testing of these machines under belt, road and field conditions.

119. FARM SANITATION AND WATER SUPPLY. Elective, second semester. Class work, two hours. Two semester credits. No prerequisite. Professor Ekblaw.

A study of sources of water supply, installation of cisterns on the farm, and farm sanitation. No text is used, the instruction being given by lectures, bulletins and library references.

120. FARM EQUIPMENT RECITATION. Elective, both semesters. Lectures and recitations, one hour. One semester credit. Professor Ekblaw.

A study of handy farm practices and important items of equipment for the farmstead is made in this course.

121. FARM EQUIPMENT LABORATORY. Elective, both semesters. Laboratory, three hours. One semester credit. Professor Ekblaw.

Practice is given in rope work, including knots, splices and halters; belt lacing and splicing; soldering; pipe fitting; and repairing of farm machinery.

125. FARM MOTORS RECITATION. Junior year, both semesters, and summer school. Lectures and recitations, two hours. Two semester credits. Professor Ekblaw.

A descriptive study of steam engines, boilers, internal-combustion engines and automobiles, with special reference to their utilization on the farm.

126. FARM MOTORS LABORATORY. Junior year, both semesters, and summer school. Laboratory, three hours. One semester credit. Assistant Professor ———.

175. THESIS. Senior year, continuing through both semesters. Professor Ekblaw, Assistant Professor Sanders, Assistant Professor ———.

Original problems relating to subjects taught in this department are assigned for investigation, after consultation with the head of the department, at the beginning of the first semester of the senior year.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED FARM MACHINERY. Senior year and elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Field Machinery and Power Machinery. Professor Ekblaw and Assistant Professor ———.

Draft tests are made on various types of farm machines. A study is made also of the cost of operating these machines.

205. FARM MACHINERY RESEARCH. Elective, both semesters. Six to fifteen hours laboratory or reading. Two to five semester credits. Assignment by permission. Prerequisites: Field Machinery and Power Machinery and such other preparation as may be necessary to conduct properly the investigation assigned. Professor Ekblaw.

Farm Machinery offers a broad field for original investigation along the lines of draft requirements, power consumption and cost of operating. Students admitted to this course are assigned to one project.

210. ADVANCED TRACTORS AND TRUCKS. Elective, both semesters. Laboratory, six hours. Two semester credits. Prerequisite: Tractors and Trucks. Professor Ekblaw and Assistant Professor Sanders.

Draft, power, and fuel economy tests are made upon standard types of tractors and trucks.

215. TRACTOR RESEARCH. Elective, both semesters. Six to fifteen hours laboratory, computation, or reading. Two to five semester credits. Prerequisites: Tractors and Trucks, and such other preparation as may

be necessary to conduct properly the problem assigned. Professor Ekblaw and Assistant Professor Sanders.

Intensive studies are made of problems relating to tractor operation and construction.

220. ADVANCED RURAL ARCHITECTURE. Elective, both semesters. Drafting-room practice, six hours. Two semester credits. Prerequisite: Rural Architecture. Professor Ekblaw.

Detailed studies and plans are made of special projects involving building arrangement and construction.

General Engineering

Dean POTTER

101. ENGINEERING LECTURES. Freshman year, continuing through both semesters. Lectures, one hour a week. Dean Potter, other members of the engineering faculty, and visiting practicing engineers.

These lectures are designed to acquaint students who are beginning the study of engineering and architecture with the fundamental principles of their profession and to give them a general survey of the field of engineering.

105. SEMINAR. Sophomore, junior, and senior years. Required throughout each year. Lectures, papers, and discussions, one hour a week. Members of the engineering faculty.

This work differs for the various curricula, and as far as possible is conducted by the student branches of the professional engineering societies. In the case of electrical engineering students the work is conducted by the student branch of the American Institute of Electrical Engineers; the student branch of the American Society of Mechanical Engineers has charge of the work for students in mechanical engineering; the Kansas State Agricultural College Civil Engineering Society and the Architects' Club conduct the seminars for students in civil engineering and architecture, respectively. Students are required to present abstracts and reviews of articles appearing in the journals of their respective societies or in the technical press of their profession or to prepare original articles. On alternate weeks these individual groups unite in the general Engineering Society, under whose auspices lectures are given by practicing engineers and by members of the Engineering and College faculty on topics of general interest to engineering students.

Shop Practice

Professor CARLSON
Instructor HOUSE
Instructor LYNCH
Instructor JONES
Instructor GRANT

Instructor BUNDY
Instructor _____
Assistant GRANELL
Assistant WHIPPO
Assistant _____

The work in the shops is planned to meet the needs of three classes of students: (1) those in the special courses related to engineering and agriculture who expect to make use of the knowledge gained in their subsequent work in the shops and on the farm; (2) those in the manual-training option of the course in general science who need to secure a sufficient knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others;

and (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and of the workmen under different conditions.

The equipment of the shops is set forth to a certain extent below:

WOOD SHOP. This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for forty-eight students in each class. In this room are also installed an automatic band-saw filer and setter, and two grindstones driven by an individual motor.

PATTERN SHOP. This room is 45 by 81 feet and contains sixteen K. S. A. C. 12-in. by 32-in. safety wood turning lathes; one 12-in motor head-stock lathe; one 18-inch pattern maker's lathe, with tools and chucks; eight pattern makers' benches complete, with necessary small tools, core-box planes, electric glue-heating fixture, and other tools and apparatus for pattern work.

WOODWORKING MACHINERY ROOM. This room is 35 by 42 feet, and contains one 24-inch wood planer, one friezer, one 34-inch band saw, one jig saw, one 20-inch variety saw, one power mortiser, one sandpapering machine, one 8-inch jointer, one foot mortiser; a stock and tool room for holding the material, and small tools and gauges used in the wood shop.

MACHINE SHOP. This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One 14-inch Hendey-Norton lathe; two 14-inch Flather lathes; one 13-inch Lodge & Davis lathe; one 16-inch Lodge & Shipley combination engine and turret lathe; two 14-inch Reed lathes; five 14-inch K. S. A. C. lathes; one 28-in. by 20-ft. American lathe, equipped with blocks to raise it to 60-inch swing; one K. S. A. C. speed lathe; one Brown & Sharp No. 3-A Universal Milling Machine; one Brown & Sharpe No. 2 universal milling machine; one No. 2 Brown & Sharpe universal grinder; one K. S. A. C. (Hendley-Norton pattern) shaper; one K. S. A. C. (Pratt & Whitney pattern) shaper; one Gray 26-in. by 6-ft. planer; one Niles 51-inch vertical turning and boring mill; one Baker Bros. Key seater; one Barnes 34-inch self-feed drill press; one Rogers 12-inch sensitive drill press; two K. S. A. C. 12-inch sensitive drill presses; one K. S. A. C. (Bemis-Miles pattern) 20-inch double-traverse quick-return shaper; two Morse & Dexter valve reseating machines; one Walker universal grinder; one K. S. A. C. special drill grinder; one bolt and pipe machine, taking pipe up to two inches; one power hack saw; one Emerson direct-connected motor polishing machine; one Bignall & Keeler pipe machine, taking pipe up to eight inches; a complete set of sheet-metal worker's tools; benches and tools for fifty students, and a tool room completely stocked with the necessary tools. A time clock (calculagraph) is installed near the machine shop office for recording the attendance of the students and workmen.

Adjacent to the machine shop is a room 18 by 20 feet, which is used as a stock and storage room for the rough and finished parts of the 1½-hp. gas engine and 12-in. by 32-in. wood-turning lathes, which are constantly in the process of construction as problem work for the students.

BLACKSMITH SHOP. This room is 50 by 100 feet and is equipped with twelve K. S. A. C. downdraft forges and thirty-three Sturtevant downdraft forges for students' use, and two large special Sturtevant forges for general use. Each forge has an anvil and a complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop there is also installed a 12-inch K. S. A. C. sensitive drill press, punch and shear, K. S. A. C. (Erie pattern) 400-pound steam hammer, emery grinder, tire bender, tire shrinker, one Oxwel oxyacetylene welding outfit, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 by 100 feet. It is equipped with a 1½-ton Colliau Cupola; 4-ton, 25-foot span K. S. A. C. traveling crane; core oven, 5 by 6 by 7 feet (arranged so it can be heated with either coke or gas); one car, track and turntable; one 2-ft. by 3-ft. K. S. A. C. rum-bler; one K. S. A. C. emery grinder; one K. S. A. C. molding machine; one Arcade squeezer-type molding machine; one air-driven sand riddler; one hammer core machine; an exceptionally large number of flasks, both wood and iron; ladles, and necessary small tools.

BRASS FOUNDRY. This room is 24 by 34 feet. It is equipped with one 21-in. by 36-in. brass furnace, one 11-in. by 20-in. brass furnace, crucibles, flasks, molding tubes, benches, cases, racks and necessary tools for bench and floor molding.

AMPHITHEATER. This room is 24 by 54 feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil, forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

LOCKER ROOM. This room is 36 by 40 feet. It is conveniently located and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker room and bathroom for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP PRACTICE

FOR UNDERGRADUATES

101. **WOODWORK.** Freshman year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. ———.

This is a course for engineering students, the first part of which consists of exercises to give familiarity with hand and bench tools. The latter part of the course is devoted to such work as will acquaint the student with the methods of operating the various woodworking machines.

105. **WOODWORK I.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Parker and Mr. ———.

This beginning course is designed to give practice with the woodworking bench tools on the various common woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

110. **WOODWORK II.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork I (Shop 105). Mr. Parker and Mr. ———.

This is a continuation of Woodwork I, with practice in the use of the rabbet, router and matching planes, and with the plow dado and fillister on such work as will give the necessary practice. Considerable emphasis is laid upon the proper use and care of the tools and on the use of wood finishes.

115. WOODWORK III. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Woodwork II (Shop 110). Mr. Parker and Mr. ———.

In this course in mill work practice is given on such articles as bring into use all of the woodworking machinery.

120. WOODWORKING FOR GRAMMAR GRADES. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: None. Mr. Parker and Mr. ———.

This course is designed for those who are preparing to teach manual training. It takes up the beginning work, and the exercises given are such as would be suitable for the grammar grades.

125. WOODWORKING I FOR HIGH SCHOOLS. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking for Grammar Grades (Shop 120.)

In this continuation of Woodworking for Grammar Grades, problems suitable for students in the high schools are given. Special attention is given to the study of woods and methods of finishing them, as well as to the use and care of tools.

130. WOODWORKING II FOR HIGH SCHOOLS. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodwork I for High Schools (Shop 125).

This is a continuation of Woodworking I for High Schools, with advanced work in cabinet construction by the use of woodworking machinery, and such bench work as necessary. Special emphasis is placed upon the quantity as well as the quality of the work, in order that a proper use may be made of time. Assignments are given which cover woodworking machinery, tools and sharpening, and the drawing up of sketches for a completely equipped woodworking shop.

135. WOODTURNING. Elective, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Woodworking II for High Schools (Shop 130). Mr. ———.

This work is such as will give the student a thorough training in handling a lathe and turning tools. Those taking this work are expected to arrange their assignments so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This training will be found valuable to those who have had no teaching experience.

140. ADVANCED WOODWORK. Elective, first semester. Laboratory, six hours, supplemented by lectures. Two semester credits. Prerequisite: Woodwork (Shop 101). Mr. Parker and Mr. ———.

Bench and machine work in making some of the most common building details, such as porch newels and rails, and plain and fancy molding cornices is given. The lecture work consists of a detailed study of the wood finishes, tools and machines used in building construction.

141. FARM SHOP PRACTICE. Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Jones and Mr. Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes act. The course consists of blacksmithing, closely related to farm work, babbitting, soldering, belt lacing, thread cutting with band dies and taps, drilling, and drill grinding.

145. PATTERN MAKING. Junior and senior years, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Mr. ———.

A series of exercises is given embodying the principles governing the construction of plain and split patterns, including core prints and core boxes, after which practical patterns are made of machine parts.

146. FARM WOODWORK. Elective, both semesters and summer school. Laboratory, nine hours. Three semester credits. Mr. Parker and Mr. ———.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making window and door frames, hanging doors, and similar building operations on full-size construction work. Bills of material will be made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. FORGING I. Freshman year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Lynch and Mr. ———.

This course in the forging of iron and steel is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching, and the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers, a center punch, and ball pein hammer weighing with handle about two pounds.

155. FORGING II. Sophomore year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Forging I (Shop 150). Mr. Lynch and Mr. ———.

Advanced work in the forging of iron and in the manufacture of steel tools is given, including instruction in hardening, tempering, casehardening and annealing, heat treating and testing of tool steels. Tools required: Same as in Forging I.

160. FOUNDRY PRACTICE. Sophomore year, both semesters. Laboratory, three hours. One semester credit. Prerequisite: None. Mr. Grant.

Practice is given in floor, bench and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

165. METALLURGY. Sophomore year, both semesters. Lectures and recitations, two hours. Two semester credits. Professor Carlson.

This course deals with the manufacture and use of iron, steel, copper and their alloys, as well as with their proper selection and use in the manufacturing industries.

170. MACHINE TOOL WORK I. Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Foundry Practice (Shop 160). Mr. Jones and Mr. Bundy.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and turning on the lathe. Tools required: A four-inch scale, or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gage.

195. THESIS. Senior year, continuing through both semesters. Professor Carlson.

A thesis gives an opportunity for the student to work out problems of interest and value to himself under his own initiative, but subject to the supervision of the instructors. The shops have ample facilities for carrying on work of this character, of a constructive or investigative nature, and every possible aid is given those who select theses along this line.

FOR GRADUATES AND UNDERGRADUATES

205. **ADVANCED PATTERN MAKING.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Pattern Making (Shop 145). Professor Carlson and Mr. Ball.

This is a continuation of Pattern Making, with more advanced work, including match-board work, patterns for molding machines, and general pattern work.

210. **ADVANCED FOUNDRY PRACTICE.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Foundry Practice (Shop 160). Professor Carlson and Mr. Grant.

This is a continuation of Foundry Practice, including green and dry sand and loam molding. A study is also made of the different mixtures of iron, of handling the cupola and brass furnace, of difficult molding and core work, and of making steel castings.

215. **FORGING III.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging II (Shop 155). Mr. Lynch and Mr. Bundy.

More advanced work is given in the working of iron and steel and in studying the effect of the different heat treatments upon steel. Opportunity will be given for work with the oxyacetylene and thermit processes of welding.

220. **FORGING IV.** Elective both semesters. Laboratory, three hours. One semester credit. Prerequisite: Forging III (Shop 215). Professor Carlson and Mr. Lynch.

Opportunity is offered for work in steel and iron, oxyacetylene welding, steam hammer work, drop forge work and other lines, depending upon the object in view and the previous training of the student.

225. **MACHINE TOOL WORK II.** Junior year, both semesters and summer school. Laboratory, six hours. Two semester credits. Prerequisite: Machine Tool Work I (Shop 170). Professor Carlson, Mr. Jones, and Mr. Bundy.

Progressive problems are given in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe with exercises in chucking, the use of forming tools, and gear cutting. A study is made of cutting edges and tool adjustments best suited to the different metals, and of cutting speeds and feeds. Tools required: same as for Machine Tool Work I.

230. **MACHINE TOOL WORK III.** Senior year, both semesters and summer school. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work II (Shop 225). Professor Carlson, Mr. Jones, and Mr. Bundy.

This course takes up work on the turret lathe, boring mill and grinder. Practical work is also given with the jigs and templets, and a study is made of the rapid production of duplicate parts, of belts, lacings and other methods of belt connection, and of compound and differential indexing.

235. **MACHINE TOOL WORK IV.** Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work III (Shop 230). Professor Carlson and Mr. Jones.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts are constructed from drawings and blue prints. A study is made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

240. MACHINE TOOL WORK V. Elective, both semesters. Laboratory, three hours. One semester credit. Prerequisite: Machine Tool Work IV (Shop 235). Professor Carlson and Mr. Jones.

This course is devoted entirely to a systematic study to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops.

245, 250. FACTORY ENGINEERING. Senior year, first semester. Lectures and recitations, one hour; drafting-room, three hours. Two semester credits. Prerequisites: Business Organization (Econ. 204) and Applied Mechanics II (Ap. Mech. 110). Professor Carlson.

This course deals with the problems of the factory executive, such as the selection, installation and arrangement of direct and indirect equipment, the standardization of machines and tools, stock and store methods, production orders, routing and dispatching, time study and rate setting, instruction and operation cards, wage systems, cost systems and the various factors that have to do with the design and control of factories.

255. FACTORY DESIGN. Senior year, second semester. Drafting, six hours. Two semester credits. Prerequisite: Factory Engineering (Shop 245, 250). Professor Carlson.

The knowledge gained in the shops and laboratories and in the course in factory engineering is used in the design of a complete factory.

260. ADVANCED SHOP PRACTICE. Elective, first semester. Laboratory, nine hours. Three semester credits. Professor Carlson and assistants.

Opportunity is offered those having the necessary preliminary training to specialize to a limited degree along certain lines of Shop Practice, such as the heat treatment of steel, oxyacetylene welding, jig and die work, cutting speeds and feeds, shop management and systems.

265. SHOP PRACTICE RESEARCH. Elective, both semesters. Laboratory, nine hours. Three semester credits. Professor Carlson.

Those who wish to investigate some phase of shop practice work in which they are greatly interested are given opportunity to do so. The wonderful improvements in the methods of present-day production amply justify investigative work along this line, and every possible aid will be accorded those wishing to take this work.

Steam and Gas Engineering

Professor POTTER
Professor CALDERWOOD
Instructor MACK

Instructor _____
Assistant _____

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting-room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports.

STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for the boiler tests three 125-horsepower high-pressure fire-tube boilers equipped with under-feed, chain-gate, and side-feed stokers; three high-pressure water-tube boilers, one being equipped with a Roney stoker and the others with under-feed stokers. Besides the high-pressure boilers there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains fourteen steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves; also a uniflow engine. These engines range in power from 6 to 250-horsepower. There are also three steam turbines equipped with surface condensers, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. The engines in this laboratory are equipped with electric generators or with absorption brakes.

Three ammonia refrigerating machines are available for laboratory work only and a fourth refrigerating machine, which serves the College, is also used for tests and research in refrigeration. One of the laboratory refrigerating machines serves a thermal testing room, equipped for low temperature experiments.

The laboratory is also provided with various types of steam pumps, steam traps, steam and ammonia indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauges, indicators, and lubricants.

GAS ENGINEERING LABORATORY

The apparatus for gas engineering instruction and research includes a Smith suction gas producer which supplies gas to a 25-horsepower Focs gas engine. This gas engine is equipped with the necessary cylinder heads and other auxiliaries, so that it can be operated with producer gas, natural gas, water gas and with light and heavy liquid fuels. Besides the Focs experimental engine, the gas engine laboratory includes about thirty different sizes and makes of gas and oil engines.

A Westinghouse air-pump, a complete compressed-air plant driven by an electric motor, and several fans, are available for experiments with air.

The gas engineering laboratory also includes several types of coal calorimeters, a Junkers and a Sargeant gas calorimeter, apparatus for approximate analysis of fuels, oil-testing equipment, a bearing tester, several different types of pyrometers, a variety of gas-engine indicators, Venturi and Pitot tubes.

The automobile equipment includes auto-trucks, a steam automobile, several types of automobile motors, differentials, transmissions, clutches, carburetors, magnetos, starting devices, and miscellaneous automobile parts.

COURSES IN STEAM AND GAS ENGINEERING

FOR UNDERGRADUATES

101. STEAM AND GAS ENGINEERING I RECITATION. Junior and senior years, first semester. Lectures and recitations, four hours. Four semester credits. Prerequisites: Kinematics (Ap. Mech. 180) and Calculus II (Math. 116). Professor Calderwood.

A study of heat power engineering, including steam engines and valve gears; the thermodynamics of gases and vapors; gas and vapor cycles. Texts: Furman's *Valve Gears*, Vol. I, and Hirshfeld and Barnard's *Heat Power Engineering*.

105. STEAM AND GAS ENGINEERING I LABORATORY. Junior and senior years, first semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering I Recitation. Professor Calderwood, Instructor Mack and assistants.

The study and calibration of steam gauges, indicators and planimeters; valve setting and steam engine operations; study of calorimeters, flow meters, and feed-water heaters; determination of the indicated and brake horsepower, mechanical efficiency and the steam consumption of high-speed automatic cut-off, Corliss, simple and compound engines; tests of DeLaval, Kerr and Terry steam turbines are included in this course. Text: Carpenter and Dietrich's *Experimental Engineering* is used in this and subsequent laboratory courses.

110. STEAM AND GAS ENGINEERING II RECITATION. Junior and senior years, second semester. Lectures and recitations, three hours. Three semester credits. Prerequisite: Steam and Gas Engineering I. Professor Potter and Professor Calderwood.

This is a continuation of the study of heat power engineering, including steam turbines; internal-combustion engines; fuels and combustion; boilers and boiler auxiliaries; gas producers; natural and artificial gas; condensers; evaporators; compressed air and refrigerating machinery. Texts: Hirshfeld and Barnard's *Heat Power Engineering*, and Sterling's *Internal Combustion Engine Manual*.

115. STEAM AND GAS ENGINEERING II LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering II Recitation. Professor Calderwood and Instructor Mack.

This course involves the approximate analysis of coal; determination of the calorific values of solid, liquid and gaseous fuels; evaporative tests of steam boilers; testing of internal combustion engines, including a study of the various auxiliaries for gas and oil engines; tests of compressed air and refrigerating machinery.

120. STEAM AND GAS ENGINEERING C RECITATION. Junior and senior years, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisites: Engineering Physics II (Physics 212) and Calculus II (Math. 116). Professor Potter and Professor Calderwood.

A descriptive study is made of steam boilers, steam engines, steam turbines, gas and oil engines, including the various auxiliaries. Text: Allen and Bursley's *Heat Engines*.

125. STEAM AND GAS ENGINEERING C LABORATORY. Junior and senior years, second semester. Laboratory, three hours. One semester credit. Taken with Steam and Gas Engineering C Recitation. Instructor Mack and assistants.

The study and calibration of steam gauges, indicators and planimeters; calorimeters; evaporative tests of steam boilers; determination of the heating value of liquid and gaseous fuels; tests of steam engines; valve setting; tests of steam turbines; tests of internal-combustion engines; operation and testing of refrigerating machines are involved in this course.

130. ELEMENTS OF STEAM AND GAS POWER. Freshman year, both semesters. Lectures, recitations, and laboratory, six hours. Two semester credits. Professor Potter, Professor Calderwood, Instructor Mack, and Instructor _____.

An elementary study is made of steam engines, steam turbines, steam boilers, steam power-plant auxiliaries, gas and oil engines, natural and manufactured gas, gas power-plant auxiliaries, and elements of automotive engineering.

170. DAIRY REFRIGERATION RECITATION. Elective, first semester. Lectures and recitations, one hour. One semester credit. Instructor Mack.

The elementary theory and principles of operation of various refrigerating and ice-making machinery and of cold storage, with special reference to the dairy industry, are considered.

175. DAIRY REFRIGERATION LABORATORY. Elective, first semester. Laboratory work, three hours. One semester credit. Instructor Mack and assistants.

Study and operation of various types of refrigeration systems; steam-engine operation and testing of refrigeration machines.

195. THESIS. Senior year, continuing through both semesters. Professor Potter and Professor Calderwood.

The laboratories of the department are well furnished with apparatus suitable for experimental and research work in the field of heat-power engineering. The subject of the investigation should be selected in consultation with the head of the department, at the beginning of the first semester.

FOR GRADUATES AND UNDERGRADUATES

206. POWER-PLANT ENGINEERING LABORATORY. Senior year, first semester. Laboratory, nine hours. Three semester credits. Professor Calderwood and Instructor Mack.

One half of the semester will be devoted to complete power-plant testing; application of Clayton's Analysis to steam-engine performance; operation of gas producers, and advanced laboratory work on internal combustion engines. The remainder of the time will be devoted to the design of a complete power plant.

210. REFRIGERATION, HEATING, AND VENTILATION RECITATION. Senior year, second semester. Lectures and recitations, two hours. Two semester credits. Prerequisite: Steam and Gas Engineering II. Professor Calderwood.

This course is planned to acquaint the student with the fundamental principles of refrigerating systems, and the application of refrigeration to ice making, cold storage, and the cooling of air liquids and solids; also the fundamental principles of heating and ventilation, including the direct and indirect systems, hot-air, hot water and steam systems of heating. Text: Hoffman's *Heating and Ventilation* and notes on refrigeration.

215. REFRIGERATION, HEATING, AND VENTILATION LABORATORY. Senior year, second semester. Laboratory, three hours. One semester credit. Taken with Refrigeration, Heating and Ventilation. Professor Calderwood and Instructor Mack.

The laboratory work will include tests of refrigerating machinery and of the thermal conductivity of insulating materials; tests on fans and blowers, radiators and house-heating boilers. The remainder of the time will be devoted to the design of heating and ventilating systems for buildings.

FOR GRADUATES

301. **ADVANCED THERMODYNAMICS.** Elective, first or second semester. Lectures and recitations, two hours. Two semester credits. Professor Calderwood.

A study is made of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports are made of recent investigations along thermodynamic lines.

305. **ENGINEERING RESEARCH.** Elective, first or second semester. One semester credit for each three hours of laboratory work. Professor Potter, Professor Calderwood and Instructor Mack.

The laboratory work is correlated with the work of the Engineering Experiment Station. Investigations on lubricants, fuels, combustion, internal-combustion engines, steam engines, steam turbines, steam boilers, gas producers, refrigeration, heating and ventilation, compressed air and similar subjects are carried on.

Engineering in the Summer School

In order to encourage the introduction of manual training and industrial drawing in the common schools and high schools of the State, and to improve the quality of work now being given, the College offers summer courses in mechanical drawing, manual training and shop practice for high-school and grade teachers.

In addition various courses required in the several engineering curricula are offered in the summer school. This enables teachers who wish to take an engineering curriculum to get a considerable start on the work during their summer vacations, and also enables College students who are irregular to make up their back courses.

For full information in regard to the courses offered, see the section of this catalogue devoted to the summer school. A special circular giving further details of this work may be had upon application to the President of the College.

Special Courses Related to Engineering

Special or short courses dealing with automobile repair, tractor operation, carpentry, machine-shop work, foundry practice, blacksmithing, telegraphy, radio-telegraphy, and electrical repair work are grouped with other special courses in another part of this catalogue, and are there described in detail. Reference should be made to the general index in the back of this book.

Division of Home Economics

HELEN BISHOP THOMPSON, *Dean.*

The philosophy which long ruled our educational policy has been so modified by research in the sciences and by development of the industries, arts, and professions that it is now recognized that any perfected educational system must include technical training. It must encourage the student's natural desire for productive work—work in which there is a living connection between theory and practice. The new method in education of combining industrial, technical and scientific work with the general studies results to the student in the power to express in everyday life the knowledge acquired. The aim of a collegiate course in home economics is not merely to increase the student's stock of information, but to stimulate interest in continued study or research, to train in accuracy in detail, to teach discrimination with regard to criteria by which to interpret results of work, and to cultivate an attitude of economic and social responsibility.

The course as outlined below is arranged to meet the needs of the following groups of students: those who wish to teach, those who wish to enter graduate courses leading to technical or professional work, and those who wish to apply their knowledge to various problems of home life or in fields of industry and social service in which an understanding of home economics subjects is essential to intelligent action. While emphasis is laid on the material and practical side of life, the training does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill even fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year curriculum, leading to the degree of bachelor of science.

A three-year curriculum, in the School of Agriculture.

A one-year curriculum in lunch-room management, for which a certificate is granted.

A housekeepers' course, fifteen weeks in length, for which a certificate of proficiency is granted.

CURRICULUM IN HOME ECONOMICS

The training in the four-year curriculum is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, sociology, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and studies of general interest. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for students to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year curriculum is recommended for all who desire to teach home economics, or to undertake any phase of institutional work.

The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions as instructors in home economics, as dietitians, or as professional housekeepers.

Curriculum in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Chemistry I	Chemistry II
Chem. 101 5(3-6)	Chem. 102 5(3-6)
Design or Design A	Household Physics
Ap. Art 101 or 106..... 3(1-6)	Physics 101 4(3-3)
Foods I	Clothing I
Food and Nut. 101..... 3(1-6) or	Clo. and Text. 101..... 2(1-3) or
Elementary Home Nursing*	House Furnishings*
Hshld. Econ. 101..... 3(3-0)	Ap. Art 108..... 2(1-3)
Library Methods	Costume Design
Lib. Ec. 101..... 1(1-0)	Clo. and Text. 106..... 2(0-6)
Current History	Physical Education W-II
Hist. 126 1(1-0)	Phys. Ed. 152A..... 1(0-3)
Physical Education W-I	
Phys. Ed. 151A..... 1(0-3)	

* The substitution of these courses for the courses in Foods I and Clothing I must first have the approval of the Dean of the Division.

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry HE	Foods II
Chem. 121 5(3-6)	Food and Nut. 106..... 5(3-6)
English Literature HE-I	English Literature HE-II
Engl. 177 3(3-0)	Engl. 180 3(3-0)
General Zoölogy	Embryology and Physiology
Zoöl. 105 5(3-6)	Zoöl. 108 5(3-6)
Clothing II	Gardening
Clo. and Text. 111..... 3(1-6)	Hort. 213 3(3-0)
Physical Education W-III	Physical Education W-IV
Phys. Ed. 153..... 1(0-3)	Phys. Ed. 154..... 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Beginning German I*	Beginning German II*
Mod. Lang. 103..... 5(5-0) or	Mod. Lang. 104..... 2(2-0) and
Beginning French I*	German Readings*
Mod. Lang. 153..... 5(5-0)	Mod. Lang. 111..... 3(3-0) or
Human Nutrition	Beginning French II*
Food and Nut. 112..... 3(3-0)	Mod. Lang. 154..... 5(5-0)
Household Microbiology	Dietetics
Bact. 121 5(3-6)	Food and Nut. 201..... 5(3-6)
Psychology	Modern Europe
Educ. 101 3(3-0)	Hist. 223 3(3-0) or
Elective 1(-)	Advanced English 3(3-0) or
	Botany
	Bot. 106 3(1-4, 2)
	Textiles
	Clo. and Text. 116..... 3(2-3)
	Elective 1(-)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
American History I	American Government
Hist. 101 3(3-0)	Hist. 151 3(3-0)
Household Management	Sanitation and Public Health
Hshld. Econ. 206..... 2(2-0)	Hshld. Econ. 211..... 3(3-0) or
Economics	Sociology
Econ. 101 3(3-0)	Econ. 251 3(3-0)
Elective 8(-)	Elective 10(-)

ADAPTATION CURRICULUM FOR THE CLASS OF 1920

The class of 1920 will be required to complete the sophomore year as provided in this curriculum, except that in the second semester Foods I and II (5 semester credits) and Psychology (3 semester credits) are required instead of Household Microbiology (5 semester credits) and Textiles (3 semester credits); the junior year as provided in this curriculum except that in the first semester Foods III (3 semester credits), Textiles (3 semester credits), and Elective (2 semester credits) are required instead of Foods II (5 semester credits) and Psychology (3 semester credits), and in the second semester Household Microbiology (5 semester credits) and Advanced Dressmaking or Millinery (2 semester credits) are required instead of Dietetics (5 semester credits) and Household Management (2 semester credits); the senior year as provided in this curriculum, except that in the first semester Dietetics and Therapeutics (5 semester credits) and Elective (4 semester credits) are required instead of Economics (3 semester credits) and Elective (6 semester credits), and in the second semester Household Administration (2 semester credits), Interior Decoration and Furnishings (2 semester credits), Economics (3 semester credits), and Elective (6 semester credits) are required instead of Sociology (3 semester credits) and Elective (10 semester credits).

* Students who have offered French or German for entrance should take advanced courses in modern language, the courses which they take depending upon their preparation. Students who under these circumstances take less than ten semester credits in modern language are required to take additional elective hours, so that their total requirement is the same as for other students.

Electives—Curriculum in Home Economics

FIRST SEMESTER	SECOND SEMESTER
Clothing Laboratory Technique Clo. and Text. 120..... 1(0-3)	Clothing III ^a Clo. and Text. 206..... 2(0-6)
Millinery Clo. and Text. 211..... 2(1-3)	Art and Fine Needlework Clo. and Text. 227..... 2(0-6)
Clothing Salesmanship Clo. and Text. 232..... 2(2-0)	Institutional Management II Hshld. Econ. 226..... 4(3-3)
Home Nursing Hshld. Econ. 112..... 3(2-3)	Special Problems of the Household Hshld. Econ. 240..... 2(0-6)
Problems in Child Welfare Hshld. Econ. 201..... 3(3-0)	Special Investigations in Foods Food and Nut. 241..... 1(0-3)
Institutional Management I Hshld. Econ. 221..... 3(1-6)	Special Problems in Institutional Administration Hshld. Econ. 246..... 2(0-6)
Dietetics Seminar Food and Nut. 231..... 2(2-0)	Special Problems in Child Welfare Hshld. Econ. 250..... 2(0-6)
Modern Problems of the Household Hshld. Econ. 236..... 2(2-0)	Interior Decoration and Furnishing Ap. Art 201..... 3(1-6)
Food Economics and Nutrition Seminar Food and Nut. 251..... 2(2-0)	Institutional Furnishings Ap. Art 203..... 3(1-6)
Investigation in Food Economics and Nutrition Food and Nut. 246..... 2(0-6)	Handcraft Ap. Art 112..... 2(0-6)
Organic Chemistry I Chem. 218 4(2-6)	Principles of Art and Their Application Ap. Art 206..... 3(3-0)
Physiological Chemistry Chem. 231 5(3-6)	Organic Chemistry II Chem. 219..... 4(2-6)
German Comedies Mod. Lang. 206..... 3(3-0)	Household Chemistry Chem. 265 3(1-6)
German Classics Mod. Lang. 226..... 3(3-0)	German or French Short Stories Mod. Lang. 201 or 251.. 3(3-0)
Scientific German I Mod. Lang. 236..... 3(3-0)	German Prose I Mod. Lang. 221..... 3(3-0)
Business English Engl. 122 3(3-0)	Scientific German II Mod. Lang. 241..... 3(3-0)
Oral English I Engl. 128 3(3-0)	Methods of Teaching English Engl. 134 3(3-0)
The Short Story Engl. 251 3(3-0)	Oral English II Engl. 131 3(3-0)
Nineteenth Century Literature Engl. 277 3(3-0)	American Literature Engl. 280 3(3-0)
Current Literature Engl. 282 2(2-0)	The Novel Engl. 285 2(2-0)
Educational Administration Educ. 105 3(3-0)	Educational Psychology Educ. 109 3(3-0)
History of Education Educ. 113 3(3-0)	Educational Sociology Educ. 118 3(3-0)
Home Economics Education Educ. 121 2(2-0)	Special Methods in the Teaching of Home Economics Educ. 132 3(3-0)
Supervised Observation and Teaching in Home Economics Educ. 141 3(0-9)	Rural Education Educ. 201 3(3-0)
Photography Physics 120 2(1-3)	Home Poultrying ($\frac{1}{2}$ semester) Poultry Husb. 102..... 1½(3-0)
American History II Hist. 202 3(3-0)	Botany Bot. 106 3(1-4, 2)
English History Hist. 121 3(3-0)	Pathology of Vegetable Food Products Bot. 108 3(1-4, 2)
Modern Europe Hist. 223 3(3-0)	Harmonics Physics 222 2(2-0)
Teachers' Course in History Hist. 127 2(2-0)	American History III Hist. 203 3(3-0)
Extempore Speech I Pub. Spk. 201..... 2(2-0)	History of the Home Hist. 225 3(3-0)
Household Entomology Ent. 106 2(2-0)	Comparative Government Hist. 252 2(2-0)
Rural Architecture Farm Eng. 102..... 3(0-9)	Extempore Speech II Pub. Spk. 202..... 2(2-0)

FIRST SEMESTER		SECOND SEMESTER	
Woodwork		Water Purification and Sewage Disposal	
Shop 101	1(0-3)	Bact. 221	3(1-6)
School Music Methods I		Institutional Accounting	
Music 120	2(-)	Math. 131	3(3-0)
Voice		School Music Methods II	
Music 130	2(2-0)	Music 121	2(-)
Piano		Voice	
Music 140	2(2-0)	Music 130	2(2-0)
Violin		Piano	
Music 135	2(2-0)	Music 140	2(2-0)
History of Music I		Violin	
Music 110	2(2-0)	Music 135	2(2-0)
Harmony I		History of Music II	
Music 101	2(2-0)	Music 111	2(2-0)
Plane Trigonometry		Harmony II	
Math. 101	3(3-0)	Music 102	2(2-0)
College Algebra		Special Methods in the Teaching of	
Math. 104	3(3-0)	Mathematics	
Hygienic Bacteriology		Math. 122	3(3-0)
Bact. 206	4(2-6)	Household Management Laboratory	
Household Management Laboratory		Hshld. Econ. 216.....	3(-)
Hshld. Econ. 216.....	3(-)		

NOTE.—Any other course for which the student has met the requirements may be chosen as an elective with the approval of the dean. Students intending to teach may elect educational subjects to the extent of the requirements of the State Board of Education for the state teachers' certificate.

Students who wish to prepare for positions as institutional managers should elect Institutional Management, Institutional Furnishings, Business English, and Accounting.

Students who wish a more general training for home making or who expect later to specialize in any phase of home economics should elect Child Welfare, Home Nursing, Interior Decoration, Home Architecture, Clothing III, and other advanced courses in the departments of the Division of Home Economics.

Applied Art.

Professor HOLMAN
Instructor AVERILL

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are to discords in sound, because we have not trained our eyes as we have our ears. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up environment of everyday life and of awakening appreciation in nature and in art." Home decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace. Each course consists of lectures, studio laboratory work, field observation work, and reading.

COURSES IN APPLIED ART

FOR UNDERGRADUATES

101. DESIGN. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. Professor Holman and Miss Averill.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function and form.

106. DESIGN A. Freshman year, first semester. Class work, one hour; studio, six hours. Three semester credits. To be taken as a substitute for Design by students who have had color and design work in high school. Professor Holman and Miss Averill.

A further study is made of harmonies, adaptation of natural motifs, and design as applied to fabrics and other materials. Art masterpieces and articles of common use are studied according to the principles of design and color.

108. HOUSE FURNISHINGS. Freshman year, second semester. Class work, one hour; studio, three hours. Two semester credits. Prerequisite: High-school design. Professor Holman.

Design is the selection and arrangement of materials for the making of useful and beautiful things. The decorative phase of design is studied in the solving of problems which occur in the furnishings of the house.

112. HANDCRAFT. Elective, second semester. Studio, six hours. Two semester credits. Prerequisite: Design. Miss Averill.

Both constructive and decorative designs are studied in handcraft work. Original designs are carried out in the following mediums: leather, clay, metal, reeds, and other materials.

FOR GRADUATES AND UNDERGRADUATES

201. INTERIOR DECORATION AND FURNISHING. Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design. Professor Holman.

This is a study of color, form and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and are developed in water color and decorating materials.

203. INSTITUTIONAL FURNISHINGS. Elective, second semester. Class work, one hour; studio, six hours. Three semester credits. Prerequisite: Design. Professor Holman.

A study is made of the fundamental principles of design, including color, form, and arrangement. These principles are applied to problems involving the selection and use of the following: wall, floors, furniture, finishes, coverings, linen, china, and silver.

206. PRINCIPLES OF ART AND THEIR APPLICATION. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Design or Design A. Professor Holman.

A general survey is made of art periods as an index to what the art quality is. An examination is made of the religious, political, and social aspects of art expression. Architecture, furniture, textiles, sculpture, pictures, and the lesser art objects are compared as to their art quality. The modern fields of landscape, architecture, furnishings, clothing, advertising, etc., are surveyed. The principles controlling art expression are applied to these modern fields of life.

Clothing and Textiles

Professor BIRDSALL
Associate Professor COWLES
Instructor FECHT
Instructor McDONALD

Assistant HARRISON
Assistant HUNT
Assistant PALMER*
Assistant GORBY

The object of the instruction in clothing and textiles is to give young women a practical knowledge of the selection of materials, of the growing of textile fibers, and of the processes used in their manufacture into fabrics. The course also includes problems in garment construction, the history of typical forms in dress, costume design and individualization, the selection, care, and renovation of factory-made garments, clothing budgets, the economic and sociological phases of the clothing industries.

101. CLOTHING I. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Assistant Professor Cowles, Miss McDonald, Miss Harrison, and Miss Gorby.

This course is especially recommended for those students who are expecting to teach clothing. The historical treatment of the development of costume includes a survey of the ancient Egyptian, Grecian, Roman, and early modern French costumes. Its aim is to give the student information regarding these different periods. The adaptation of these costumes to present fashions is discussed.

Laboratory.—The laboratory exercises of this course deal with problems in garment construction. The nature of the problem is dependent upon the preparation of the student.

106. COSTUME DESIGN. Freshman year, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Design. Miss Hunt.

A study of art in dress, comprising the application of the principles of color, harmony and design, individual requirements in color and line, comparative design of ancient and modern costumes, original problems in designs for embroidering, sketching of costumes in pencil, pen and ink, and water colors. This course is directly related to the construction of garments.

111. CLOTHING II. Sophomore year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Costume Design. Assistant Professor Cowles, Miss Harrison, Miss McDonald, and Miss Gorby.

This course considers the manufacture and selection of clothing; comparison of home- and factory-made garments; hygienic factors involved in clothing; standardization of dress, its meaning, advantages and disadvantages; division of income; and the relation of clothing and the clothing industry to the general life of the community in an economical and sociological way.

Laboratory.—The laboratory work begins with modeling in cambric, establishing the principal lines for measurements, and developing an appreciation of the relation of the lines of patterns to different forms. This is followed by practice in taking measurements, in drafting foundation patterns by the straight-line system, and in making variations of all kinds from these. Emphasis is laid upon the development of one pattern from another and of the complex design from the simple. Designs are

* Died December 9, 1918.

worked out upon the paper patterns and are adapted in a problem of advanced clothing construction. Notebook work is required.

116. TEXTILES. Junior year, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the historical and economic development of the textile industry, from primitive ages to the present time. The combination of art, science and mechanics that makes possible the elaborateness of modern textiles is given careful attention.

Laboratory.—The behavior of textile fibers toward various chemical reagents is studied. Physical and microscopic tests are made for the identification of fibers. Bleaching and dyeing; laundry processes as they affect color, shrinkage, strength, etc.; and analysis of mixed goods are likewise considered in the laboratory work.

120. CLOTHING LABORATORY TECHNIQUE. Elective, both semesters. Laboratory, three hours. One semester credit.

This course is offered to all students preparing to teach clothing and textiles in grade and high school. The course has as its aim the development of technique and the making of illustrative material for use in the teaching of these courses. To accompany Educ. 132.

FOR GRADUATES AND UNDERGRADUATES

206. CLOTHING III. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Miss Harrison and Miss McDonald.

This course emphasizes the artistic in lines and decoration, deals with the design and adaptation of materials for the individual and occasion, and lays special stress on self-expression through dress. It also presents the use of commercial patterns, and includes practice in cutting, fitting, finishing, and draping such materials as silks, satins, chiffons, and laces.

211. MILLINERY. Elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Professor Birdsall.

This course includes a discussion of practical and artistic principles of millinery, attention being given to taste and economy in the selection of hats. Renovating and the use of old materials is considered.

227. ART AND FINE NEEDLEWORK. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: Clothing II. Professor Birdsall and Miss McDonald.

This course includes the following: stitches in crochet, knitting, cross stitch, French embroidery, Roman cut work; their application to garments, and household linens. Instruction in needlework is applied to lingerie, and children's and infants' clothing.

232. CLOTHING SALESMANSHIP. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Clothing II.

This course provides instruction to those who wish to prepare themselves for positions as educational or departmental directors in large stores, service managers in factories, or teachers of salesmanship. Actual practice in department stores followed by reports and conferences; study of department systems and policy, based on observation, together with a certain amount of practical experience, is required of all students.

Food Economics and Nutrition*

Professor _____
 Associate Professor ROTHERMEL
 Assistant Professor PITTMAN†
 Instructor SKINNER
 Instructor GREEN

Instructor PERRY
 Instructor SMITH
 Assistant _____
 Assistant _____
 Fellow _____

Food is one of the determining factors in the health of the individual and of the family. The selection of wholesome and economical food requires the constant application of chemistry and of sanitary science. The preparation and preservation of food involve processes dependent upon physics, chemistry, and bacteriology. In the modern science of dietetics the student learns to apply her knowledge of food constituents and of the chemical and physiological changes in nutrition. Science, applied science, and practice are presented in their proper relations in order to train the student in fundamental principles and to enable her to gain by experience methods of translating these principles into everyday household practices. Advanced courses in this department provide training for vocational and professional positions in the field of home economics.

COURSES IN FOOD ECONOMICS AND NUTRITION

FOR UNDERGRADUATES

101. FOODS I. Freshman year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Entrance credit in Physics, parallel Chemistry I. Assistant Professor Cox and Misses Perry and Clark.

The application of heat to various food principles is the basis of study in this course. The economic uses of the various foodstuffs is emphasized, as is also the study of commercially prepared food products.

Laboratory.—Experimental and practical cookery, illustrating this course, forms the basis of the laboratory work.

106. FOODS II. Sophomore year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Organic Chemistry, parallel Human Physiology. Dean Thompson, Miss Smith.

This course emphasizes the classification, composition, occurrence, general properties and nutritive values of foodstuffs. Food values in relation to cost are considered, together with the legal and sanitary aspects of food products handled in commerce.

Laboratory.—Food products are handled in experiments which demonstrate the presence of the proximate principles and the various inorganic constituents, the changes they undergo in cooking, and their nutritive value as affected by admixture with other food materials. Compilation of recipes. Practice in judging food preparations.

112. HUMAN NUTRITION. Junior year, both semesters. Lectures and recitations, three hours. Three semester credits. Prerequisites: Organic Chemistry, Human Physiology, and Foods II.

* The courses described under this group and under the following one, Household Economics, were listed in the ~~1918-19~~ ¹⁹¹⁸⁻¹⁹ catalogue under the Department of Domestic Science, with the following personnel for the year 1918-19: Professor Haggart, Assistant Professor Cox, Assistant Professor Rothermel, Instructor Green, Instructor Monroe, Instructor Perry, Instructor Smith, Assistant Clark, Assistant McCoy, Assistant Bennett (first semester only).

† Beginning September 1, 1919.

This course comprises a study of the special characteristics and nutritive functions of the food constituents; the methods of investigation which have established the quantitative basis in dietetics; the digestive and metabolic processes and products with emphasis upon energy relations; the quantitative relations of the ash constituents; nitrogen and mineral balances; comparative economy in nutrition and growth of different types of food materials.

FOR GRADUATES AND UNDERGRADUATES

201. DIETETICS. Junior year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Foods II and Human Nutrition. Assistant Professor Rothermel and Misses Green and Smith.

This course deals with the application of the principles of human nutrition to the practical feeding problems of the individual and the group. The following topics receive attention: Daily food requirements in health and disease throughout infancy, childhood, adolescence, adult life, and old age; typical dietaries for each period of life; the problem of satisfying the diverse requirements in families and other groups; milk formulæ; quantitative estimations of special diets for abnormal conditions of nutrition and deficiency diseases; corrective treatment of glandular disturbances.

Laboratory.—Studies in weight measures and cost of some of the common food materials; experiments showing digestive changes and modifications of food materials; calculations and quantitative preparation of standard portions and combinations of foods; analysis of recipes; computation and scoring of dietaries with special regard to nutritive requirements for varying physiologic, economic and social conditions; practice in dietetical clinic and in marketing and serving comprise the work in the laboratory.

231. DIETETICS SEMINAR. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Dietetics.

This is a course of assigned reading and discussion of topics in such food and nutrition investigations as bear upon problems in dietetics, in both normal and pathological conditions. Laboratory and hospital methods of investigation in nutritive requirements and utilization of food are studied.

241. SPECIAL INVESTIGATIONS IN FOODS. Elective, second semester. One semester credit. Hours to be arranged.

Special problems are assigned to students for individual consideration.

246. INVESTIGATION IN FOOD ECONOMICS AND NUTRITION. Elective, both semesters. From two to five semester credits, depending upon the nature of the problem. Conferences, laboratory work, and reports. Open to senior and graduate students.

The work of this course may consist of an assigned problem in the nutritive value of foods; a feeding experiment; dietary studies or practice in the methods commonly used in the simpler experiments in nutrition.

251. FOOD ECONOMICS AND NUTRITION SEMINAR. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Human Nutrition.

The object of this course is to train for independent work in the fields of food economics and certain phases of nutrition. Special attention is given to the study of recent advances in the science of nutrition, particularly in relation to growth and to normal and subnormal nutrition in infancy and childhood. Feeding experiments are compared and discussed. A reading knowledge of modern languages, while not a fixed requirement, is urged as of especial advantage in this course.

Household Economics

Professor KNEELAND †
Associate Professor REYNOLDS †
Assistant Professor _____

Instructor WARD §
Assistant McCoy
Fellow _____

Since the home is dependent upon wise expenditures of time, money and labor, direct use of the principles of economics is made in the courses in household management. The laws of sanitary and social sciences are shown to be basic to such subjects as institutional administration, home nursing, and child welfare.

Throughout the work of this department effort is made to develop the student's ability to carry into practice the principles pertaining to home making. Interest in community service and industrial and social problems is stimulated. Students who plan to do executive work as directors of residence, institutional managers, visiting housekeepers, or hospital dietitians will find suitable electives in this department.

COURSES IN HOUSEHOLD ECONOMICS

FOR UNDERGRADUATES

101. **ELEMENTARY HOME NURSING.*** Freshman year, first semester. Class work, three hours. Three semester credits.

Hygiene is studied with a view to the improvement and maintenance of health. Practical methods of preventing disease and of dealing with accidents and emergencies are investigated. Standards of community health, household and hospital practices in care of the sick and convalescent receive attention. Supplementary reading is required.

112. **HOME NURSING.** Elective, both semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Human Physiology and Household Microbiology. Professor Haggart and Miss Bennett.

This course puts special emphasis on the prevention of disease and on the building up of the highest degree of health as the principal function of the home nurse. Among the more important topics treated are the following: Surgical accidents and emergencies; methods of controlling infectious and contagious diseases; significance of symptoms; treatment of functional disturbances; care of chronic cases in the execution of physician's prescriptions; and the application of dietetic therapy.

FOR GRADUATES AND UNDERGRADUATES.

201. **PROBLEMS IN CHILD WELFARE.** Elective, first semester. Class work, three hours. Three semester credits. Prerequisites: Physiology and Psychology.

A study is made of the rational care of the child and of the principles of child welfare. It includes the factors that influence physical fitness, the daily routine of the infant, and the constructive and preventive measures in physical and mental development of the child.

206. **HOUSEHOLD MANAGEMENT.** Senior year, first semester. Class work, two hours. Two semester credits. Prerequisites: Foods II. Professor Haggart.

† Beginning September 1, 1919.

§ Beginning July 1, 1919.

* This course may be taken in place of Foods I, with the approval of the Dean of the Division.

This course includes a study of the evolution of the home and its relation to society; the organization and management of the household in order to secure the maximum of family welfare; the budget and its apportionment; the household accounts. There are lectures and class discussions, and reference work is required.

211. SANITATION AND PUBLIC HEALTH. Senior year, both semesters. Class work, three hours. Three semester credits. Prerequisite: Household Microbiology. Miss Bennett.

This course includes a study of conditions which determine the healthfulness of the household and the application of principles of sanitation to its care. Public-health movements in relation of home sanitation to the community is emphasized. Lectures are given and reference work is required.

216. HOUSEHOLD MANAGEMENT LABORATORY. Elective, both semesters. Three semester credits.

This course is conducted in the practice house. The students live in a group and perform the usual household tasks, including marketing, cooking and serving meals, cost accounting, and care of the rooms. Students who are planning to qualify as teachers under the Smith-Hughes requirements for vocational high schools should elect this course.

221. INSTITUTIONAL MANAGEMENT I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Foods II. Miss McCoy.

This course is a study of the food problem of institutions and includes the study of marketing, preparation of food, and cost of service.

Laboratory.—The preparation of food for institutional use and practical experience in the cafeteria of the department are included in the laboratory work.

226. INSTITUTIONAL MANAGEMENT II. Elective, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: Institutional Management I. Miss McCoy.

This course includes a study of the various types of institutions, their aim, support, control, needs, equipment and methods of purchasing supplies, together with a study of the essential characteristics, preparation and duties of the manager. Lectures are given, followed by discussion. Reference and observation work are required.

Laboratory.—Experience is given in the cafeteria of the department and special problems of other institutions are investigated.

230. TEA-ROOM ORGANIZATION. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits.

It is the purpose of this course to train the student in the special forms of food service, business, and social management required in commercial tea rooms.

Laboratory.—Practical work in tea-room service, catering, food-shop problems.

236. MODERN PROBLEMS OF THE HOUSEHOLD. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: Economics, and Household Management. Professor Haggart.

Problems for investigation, as budget studies of individual families, conditions in industrial welfare, and cost of living, are assigned.

240. SPECIAL PROBLEMS OF THE HOUSEHOLD. Elective, second semester. Assigned work, giving two or more semester credits, depending upon the nature of the problem. Prerequisite: Modern Problems of the Household.

This is a continuation of the preceding course in the form of a thesis, presenting the results of original investigation of an economic or sociological problem of the household.

246. SPECIAL PROBLEMS IN INSTITUTIONAL ADMINISTRATION. Elective, second semester. Assigned work, giving two or more semester credits, depending upon the nature of the problem. Prerequisite: Institutional Management II.

The organization and management of institutions of various types are investigated. Social and legal aids in the solution of problems pertaining to employment of service, business organization and administration of institutions are studied.

250. SPECIAL PROBLEMS IN CHILD WELFARE. Elective, second semester. Assigned work, giving two or more semester credits, depending upon the nature of the problem. Prerequisite: Problems in Child Welfare.

An agency or condition of social or economic life operating as a factor in the health and development of children is investigated.

Home Economics in the Summer School

In addition to instruction in various branches of home economics available to teachers during the regular College year, the College offers several courses in this subject in the summer school. Instruction in these courses is intended to present correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

A special circular giving in detail the courses offered in the summer school may be had by applying to the Vice President of the College. See, also, the article on Summer School in this catalogue.

Special Courses in Home Economics

The Housekeepers' Course, which is completed in fifteen weeks and is given each semester, and the one-year curriculum in Lunch-room Management are to be found grouped and described with other special courses in another part of this catalogue. They may be found by reference to the general index in the back of this book.

Division of General Science

JULIUS TERRASS WILLARD, *Dean.*

In the class of colleges to which this institution belongs the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the State and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among persons and activities, peoples and events with breadth of view and tolerance of attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basic, scientific, cultural and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the more readily visible, and evidently important parts. These departments thus give unity to all of the four-year curricula, although presenting but few curricula that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

CURRICULUM IN GENERAL SCIENCE

The curriculum in general science includes fundamental training in English, mathematics, science, history, economics, military science, and physical training required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some, instead of taking the vocational subjects characterizing other courses. This opportunity meets the needs of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the State. The electives offered allow one to give special attention to mathematics, physical science, biological science, agriculture, domestic science and art, history, economics, English, journalism, music, and professional educational subjects, and several other lines. (3) Those who are fitting

themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this curriculum are to a considerable extent made up of studies required in one or more of the specialized curricula. They provide also, however, advanced work not included in other curricula. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the curriculum in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other curricula. The studies of the freshman and sophomore years are basic and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, approved by the faculty or by the Dean of the Division of General Science, and in such manner as to give logical coherence to the curriculum as a whole. The elective portion of the curriculum, as thus made up, will consist for the most part of several groups of two or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. Special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. Students changing from other curricula to that in general science receive credit for work done in the other curricula in so far as it can be fitted into the general plan of this one.

The curriculum in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented here with the required subjects of the curriculum in their specified order by years and semesters, together with a considerable number of groups of electives.

CURRICULUM IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be widely read in this day it must stand out from the great mass of other matter and gain the attention and hold the interest of the reader. To do this its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The curriculum in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and

effectively, particularly upon industrial subjects. To such subjects the modern newspaper and the general magazine are giving constantly more attention, while there are also 500 agricultural publications and a greater number of class and trade publications which are largely or exclusively concerned with matters relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the curriculum is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The curriculum consequently offers, in the first place, fundamental studies of literary, social and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect German or French. In the second place, the student is required to elect subjects in agriculture, mechanic arts, applied science, or home economics, depending on the portion of the field of industrial journalism which he desires to enter, it being expected that every student graduated from the curriculum shall have special knowledge of some prominent line of industry. In the third place, the theory and practice of journalism are presented in a series of courses extending throughout the sophomore, junior, and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery and much of application are yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

CURRICULA IN APPLIED CHEMISTRY

The facilities for instruction in chemistry are ample, and the demand of students for curricula planned especially to give chemical training is such that formulations have been made to meet the needs of those desiring to specialize in agricultural chemistry, biochemistry, or industrial chemistry. By suitable modifications of the curriculum in industrial chemistry the needs of students interested in chemical engineering are met. The instructional facilities of the department of chemistry reinforced by opportunities for practical work in connection with the researches of the experiment stations are such as to provide amply for this specialized training.

Curriculum in General Science

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Chemistry I	Chemistry II
Chem. 101 5(3-6)	Chem. 102 5(3-6)
Plane Trigonometry	College Algebra *
Math. 101 3(3-0)	Math. 104 3(3-0)
General Botany I	General Botany II
Bot. 101 3(1-4, 2)	Bot. 102 3(1-4, 2)
Current History	Current History
Hist. 126 1(1-0)	Hist. 126 1(1-0)
Library Methods	Elective † 2(-)
Lib. Ec. 101 1(1-0)	
Military Science I (Men)	Military Science II (Men)
Mil. Tr. 101 1(0-3)	Mil. Tr. 102 1(0-3)
Physical Education M-I	Physical Education M-II
Phys. Ed. 103 (0-2) or	Phys. Ed. 104 (0-2) or
Physical Education W-I	Physical Education W-II
Phys. Ed. 151A 1(0-3)	Phys. Ed. 152A 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
English Literature I	English Literature II
Engl. 171 4(4-0)	Engl. 174 4(4-0)
English History	Modern Europe
Hist. 121 3(3-0)	Hist. 223 3(3-0)
General Physics I	General Physics II
Physics 201 4(3-3)	Physics 202 4(3-3)
General Zoölogy I	General Zoölogy II
Zoöl. 101 3(2-3)	Zoöl. 102 3(2-3)
Elective † 3(-)	Elective † 3(-)
Military Science III (Men)	Military Science IV (Men)
Mil. Tr. 103 1(0-3)	Mil. Tr. 104 1(0-3)
Physical Education M-III (Men)	Physical Education M-IV (Men)
Phys. Ed. 105 (0-2) or	Phys. Ed. 106 (0-2) or
Physical Education W-III (Women)	Physical Education W-IV (Women)
Phys. Ed. 153 1(0-3)	Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
American Government	American History I
Hist. 151 3(3-0)	Hist. 101 3(3-0)
Psychology	Economics
Educ. 101 3(3-0)	Econ. 101 3(3-0)
Extempore Speech I	General Microbiology
Pub. Spk. 201 2(2-0)	Bact. 101 3(1-6)
Elective † 8(-)	Elective † 6(-)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Elective † 16(-)	Elective † 16(-)

* Students who offer but one unit of algebra for admission take a five-credit course in College Algebra, Math. 107. The additional credits are applied against electives.

† Electives are to be chosen, with the advice and approval of the Dean, in groups of not less than eight semester credits, or in courses which extend fields already entered in the required work.

Groups of Electives and Options for Students in the Division of General Science

In addition to the courses included in the following groups, others will be found described in the exposition of the work of the respective departments.

From any group elected a sufficient number of courses to constitute an effective block of knowledge must be taken. At least eight semester credits in any new field are usually required, but a smaller number will be honored if in a field already entered upon.

FIRST SEMESTER	SECOND SEMESTER
1	
Advanced Composition I Engl. 113 2(2-0)	Advanced Composition II Engl. 116 2(2-0)
Business English Engl. 122 3(3-0)	Advertising English Engl. 125 3(3-0)
Oral English I Engl. 128 3(3-0)	Oral English II Engl. 131 3(3-0)
Composition and Literature I Engl. 151 2(2-0)	Composition and Literature II Engl. 154 2(2-0)
Argumentation and Debate Engl. 119 3(3-0)	Methods of Teaching English Engl. 134 3(3-0)
The Short Story Engl. 251 3(3-0)	Community English Engl. 254 2(2-0)
2	
The English Bible Engl. 271 3(3-0)	The Shakespearian Drama Engl. 274 3(3-0)
Nineteenth Century Literature Engl. 277 3(3-0)	American Literature Engl. 280 3(3-0)
Current Literature Engl. 282 2(2-0)	The Novel Engl. 285 2(2-0)
English Survey I Engl. 288 2(2-0)	English Survey II Engl. 290 2(2-0)
Tennyson and Browning Engl. 293 3(3-0)	The Arts and Crafts Movement Engl. 295 2(2-0)
3	
German I Mod. Lang. 101..... 3(3-0)	German II Mod. Lang. 102..... 3(3-0)
German Readings Mod. Lang. 111..... 3(3-0)	German Short Stories Mod. Lang. 201..... 3(3-0)
Scientific German I Mod. Lang. 236..... 3(3-0)	Scientific German II Mod. Lang. 241..... 3(3-0)
4	
French I Mod. Lang. 151..... 3(3-0)	French II Mod. Lang. 152..... 3(3-0)
French Readings Mod. Lang. 161..... 3(3-0)	French Short Stories Mod. Lang. 251..... 3(3-0)
Spanish I Mod. Lang. 176..... 3(3-0)	Spanish II Mod. Lang. 177..... 3(3-0)

5

FIRST SEMESTER

Plane Analytical Geometry	
Math. 110	4(4-0)
Calculus I	
Math. 113	5(5-0)
Analysis of Statistics	
Math. 125	3(3-0)
Differential Equations	
Math. 201	3(3-0)

SECOND SEMESTER

Calculus	
Math. 119	3(3-0)
Calculus II	
Math. 116	3(3-0)
Institutional Accounting	
Math. 131	3(3-0)
Special Methods in the Teaching of Mathematics	
Math. 112	3(3-0)

6

Advanced Inorganic Chemistry	
Chem. 207	3(3-0)
Inorganic Preparations	
Chem. 202 ...	2(0-6) to 4(0-12)
Industrial Chemistry I	
Chem. 203	5(3-6)

Industrial Electro-chemistry	
Chem. 205	2(2-0)
Physical Chemistry	
Chem. 206	5(3-6)
Industrial Chemistry II	
Chem. 204	5(3-6)

7

Organic Chemistry I	
Chem. 218	4(2-6)

Organic Chemistry II	
Chem. 219	4(2-6)
Physiological Chemistry	
Chem. 231	5(3-6)

8

Quantitative Analysis I	
Chem. 150	2(0-6)
Quantitative Analysis II	
Chem. 250	3(1-6)
Advanced Qualitative Analysis	
Chem. 240	3(1-6)

Quantitative Analysis I	
Chem. 150	2(0-6)
Quantitative Analysis III	
Chem. 251	3(1-6)
Household Chemistry	
Chem. 265	3(1-6)

9

Household Physics	
Physics 101	4(3-3)
Photography	
Physics 120	2(1-3)
Molecular Physics	
Physics 221	4(3-3)
Wireless Telegraphy	
Physics 130	2(1-3)

Agricultural Physics	
Physics 111	3(3-0)
Harmonics	
Physics 222	2(2-0)
Physical Measurements	
Physics 223	3(2-3)
Special Methods in the Teaching of Physics	
Physics 224	3(2-3)

10

Agricultural Microbiology	
Bact. 106	3(1-6)
Hygienic Bacteriology	
Bact. 206	4(2-6)
Pathogenic Bacteriology II	
Bact. 116	4(2-6)
Poultry Bacteriology	
Bact. 216	3(1-6)

Soil Microbiology	
Bact. 201	3(1-6)
Pathogenic Bacteriology I	
Bact. 111	4(2-6)
Dairy Bacteriology	
Bact. 211	3(1-6)
Water Purification and Sewage Disposal	
Bact. 221	3(1-6)

11

Plant Pathology I	
Bot. 107	3(1-4, 2)
Plant Pathology II	
Bot. 201	3(1-4, 2)
Plant Genetics I	
Bot. 211	3(1-4, 2)
Economic Botany	
Bot. 219	3(1-4, 2)
Evolution of Plants	
Bot. 222	3(3-0)

Plant Physiology I	
Bot. 208	3(3-0)
Plant Breeding	
Bot. 205	3(1-4, 2)
Plant Histology	
Bot. 215	2(0-6)
Taxonomic Botany	
Bot. 225	3(1-4, 2)

12

FIRST SEMESTER

Advanced Invertebrate Zoölogy	
Zoöl. 201	4(2-6)
Taxonomy of Invertebrates	
Zoöl. 205	3(0-9)
Cytology	
Zoöl. 214	4(2-6)
Parasitology	
Zoöl. 123	2(1-3)

Dynamic and Structural Geology	
Geol. 101	2(2-0)

General Entomology	
Ent. 101	3(2-3)
Insect Morphology I	
Ent. 211	3(1-6)
Advanced General Entomology	
Ent. 221	3(3-0)

American History II	
Hist. 202	3(3-0)
American Industrial History	
Hist. 105	3(3-0)
Pan-America	
Hist. 207	2(2-0)
Modern England and the British Empire	
Hist. 226	3(3-0)
The Ancient World	
Hist. 229	3(3-0)
American Political History	
Hist. 206	2(2-0)

Business Law I	
Hist. 153	1(1-0)
International Law	
Hist. 256	2(2-0)

Economics	
Econ. 101	3(3-0)
Sociology	
Econ. 251	3(3-0)
Business Organization	
Econ. 204	1(1-0)
Labor Problems	
Econ. 207	2(2-0)

Educational Administration	
Educ. 105	3(3-0)
History of Education	
Educ. 113	3(3-0)
Rural Education	
Educ. 201	3(3-0)

SECOND SEMESTER

Advanced Vertebrate Zoölogy	
Zoöl. 202	4(2-6)
Taxonomy of Vertebrates	
Zoöl. 208	3(0-9)
Animal Ecology	
Zoöl. 211	3(1-6)
Economic Zoölogy	
Zoöl. 126	3(1-6)

Historical Geology	
Geol. 201	2(2-0)
Engineering Geology	
Geol. 102	4(2-6)

General Economic Entomology	
Ent. 206	3(2-3)
Principles of Taxonomy	
Ent. 216	1(1-0)
Apiculture	
Ent. 111	3(2-3)

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American History III	
Hist. 203	3(3-0)
European Industrial History	
Hist. 224	3(3-0)
Immigration and International Relations	
Hist. 228	2(2-0)
Comparative Government	
Hist. 252	2(2-0)
Kansas History	
Hist. 230	2(2-0)
History of the Home	
Hist. 225	3(3-0)

16

Business Law II	
Hist. 154	1(1-0)
Farm Law	
Hist. 155	2(2-0)

17

Agricultural Economics	
Ag. Ec. 101	3(3-0)
Marketing and Coöperation	
Ag. Ec. 201	2(2-0)
Money and Banking	
Econ. 210	2(2-0)
Public Finance	
Econ. 213	2(2-0)

18

Educational Psychology	
Educ. 109	3(3-0)
Educational Sociology	
Educ. 118	3(3-0)

19	
FIRST SEMESTER	SECOND SEMESTER
Agricultural Education Educ. 125 2(2-0)	Special Methods in the Teaching of Agriculture Educ. 136 3(3-0)
Home Economics Education Educ. 121 2(2-0)	Supervised Observation and Teaching in Agriculture Educ. 146 3(0-9)
Industrial Education Educ. 129 2(2-0)	Special Methods in the Teaching of Home Economics Educ. 132 3(3-0)
	Supervised Observation and Teaching in Home Economics Educ. 141 2(0-6)
	Special Methods in the Teaching of Industrial Arts Subjects Educ. 140 3(3-0)
	Supervised Observation and Teaching in Industrial Arts Educ. 150 3(0-9)
20	
Elementary Journalism Ind. Jour. 107 2(2-0)	Industrial Writing Ind. Jour. 113 2(2-0)
Journalism Practice I Ind. Jour. 110 2(0-6)	Journalism Practice II Ind. Jour. 116 2(0-6)
Industrial Feature Writing Ind. Jour. 123 2(2-0)	Technical Journalism Ind. Jour. 130 2(2-0)
Journalism Practice III Ind. Jour. 127 2(0-6)	Journalism Practice IV Ind. Jour. 133 2(0-6)
21	
Materials of Journalism Ind. Jour. 213 2(2-0)	Magazine Features Ind. Jour. 216 2(-)
History of Journalism Ind. Jour. 219 2(2-0)	Journalism Surveys Ind. Jour. 222 2(0-6)
23	
Voice (Music 130)	
Two private lessons a week. Two semester credits.	
Piano (Music 140)	
Two private lessons a week. Two semester credits.	
Violin (Music 135)	
Two private lessons a week. Two semester credits.	
Wind Instruments (Music 145)	
Two private lessons a week. Two semester credits.	
Harmony I Music 101 2(2-0)	Harmony II Music 102 2(2-0)
Harmony III Music 103 2(2-0)	Harmony IV Music 104 2(2-0)
Counterpoint Music 107 2(2-0)	Musical Form and Analysis Music 109 2(2-0)
History of Music I Music 110 2(2-0)	History of Music II Music 111 2(2-0)
School Music Methods I Music 120 2(-)	School Music Methods II Music 121 2(-)
School Music Methods III Music 122 2(-)	School Music Methods IV Music 123 2(-)
Choral Society Music 150 1(1-0)	Choral Society Music 150 1(1-0)
Orchestra Music 151 1(1-0)	Orchestra Music 151 1(1-0)
Military Band Music 152 1(1-0)	Military Band Music 152 1(1-0)

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FIRST SEMESTER

American History I	
Hist. 101	3(3-0)
American Government	
Hist. 151	3(3-0)
Pan-America	
Hist. 207	2(2-0)
English History	
Hist. 121	3(3-0)
Economics	
Econ. 101	3(3-0)
Business Organization	
Econ. 204	1(1-0)
Labor Problems	
Econ. 207	2(2-0)
Sociology	
Econ. 251	3(3-0)

SECOND SEMESTER

American History II <i>or</i> III	
Hist. 202 <i>or</i> 203	3(3-0)
Modern Europe	
Hist. 223	3(3-0)
Agricultural Economics	
Ag. Ec. 101	3(3-0)
Money and Banking	
Econ. 210	2(2-0)
Public Finance	
Econ. 213	2(2-0)
Marketing and Coöperation	
Ag. Ec. 201	2(2-0)
Agricultural Land Problems	
Ag. Ec. 216	1(1-0)

31

General Botany I	
Bot. 101	3(1-4, 2)
Plant Pathology I	
Bot. 107	3(1-4, 2)
Economic Botany	
Bot. 219	3(1-4, 2)
Farm Forestry	
Hort. 113	4(3-3)

General Zoölogy I	
Zoöl. 101	3(2-3)
Parasitology	
Zoöl. 123	2(1-3)
Embryology and Physiology	
Zoöl. 108	5(3-6)
Hygienic Bacteriology	
Bact. 206	4(2-6)
General Entomology	
Ent. 101	3(2-3)
Horticultural Entomology	
Ent. 201	2(2-0)
Organic Chemistry	
Chem. 120	3(2-3)
Quantitative Analysis I	
Chem. 150	2(0-6)
Chemistry of Soils and Fertilizers	
Chem. 252	3(1-6)
Chemistry of Crops	
Chem. 253	3(1-6)
Human Nutrition	
Food and Nut. 112	3(3-0)
Household Physics	
Physics 101	4(3-3)
Photography	
Physics 120	2(1-3)

Household Physics	
Physics 101	4(3-3)
Organic Chemistry HE	
Chem. 121	5(3-6)
Foods II	
Food and Nut. 106	5(3-6)
Human Nutrition	
Food and Nut. 112	3(3-0)

General Botany II	
Bot. 105	3(1-4, 2)
Plant Breeding	
Bot. 205	3(1-4, 2)
Seed Identification and Weed Control	
Agron. 105	2(1-3)
Plant Propagation	
Hort. 101	3(2-2, 1)
Gardening	
Hort. 213	3(3-0)
Landscape Gardening I	
Hort. 216	4(2-6)
General Zoölogy II	
Zoöl. 102	3(2-3)
Economic Zoölogy	
Zoöl. 126	3(1-6)
General Microbiology	
Bact. 101	3(1-6)
Water Purification and Sewage Disposal	
Bact. 221	3(1-6)
General Economic Entomology	
Ent. 206	3(2-3)
Apiculture	
Ent. 111	3(2-3)

Dairy Chemistry	
Chem. 254	3(1-6)
Chemistry of Meats	
Chem. 255	3(1-6)
Household Chemistry	
Chem. 265	3(1-6)
Agricultural Physics	
Physics 111	3(3-0)
Wireless Telegraphy	
Physics 130	2(1-3)

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Foods I	
Food and Nut. 101	3(1-6)
Household Microbiology	
Bact. 121	5(3-6)
Dietetics	
Food and Nut. 201	5(3-6)

FIRST SEMESTER

Design	
Ap. Art 101.....	3(1-6)
Clothing II	
Clo. and Text. 111.....	3(1-6)
Interior Decoration and Furnishing	
Ap. Art 201.....	3(1-6)

General Botany I	
Bot. 101	3(1-4, 2)
Market Grades and Classes of Livestock	
An. Husb. 101.....	3(1-6)
Grain Crop Production	
Agron. 101	3(2-2, 1)
Elements of Dairying	
Dairy Husb. 101.....	3(2-3)
Organic Chemistry	
Chem. 120	3(2-3)
Plant Pathology I	
Bot. 107	3(1-4, 2)
Soils	
Agron. 131	4(3-3)
Quantitative Analysis I	
Chem. 150	2(0-6)

Engineering Drawing	
Ap. Mech. 155.....	2(0-6)
Freehand Drawing I	
Arch. 111	2(0-6)
Design I	
Arch. 142	3(0-9)
Domestic Architecture	
Arch. 172	2(0-6)

Wood Working for Grammar Grades	
Shop 120	2(0-6)
Wood Working II for High Schools	
Shop 130	2(0-6)
Forging I	
Shop 150	1(0-3)
Forging III	
Shop 215	1(0-3)
Foundry Practice	
Shop 160	1(0-3)
Machine Tool Work I	
Shop 170	2(0-6)
Machine Tool Work III	
Shop 230	1(0-3)
Farm Motors	
Farm Engr. 125, 126...	3(2-3)
Concrete Construction	
Ap. Mech. 140, 145....	2(1-3)
Mechanical Drawing I	
Ap. Mech. 161.....	2(0-6)

Organic Chemistry	
Chem. 120	3(2-3)
Quantitative Analysis II	
Chem. 250	3(1-6)
Grain Crop Production	
Agron. 101	3(2-2, 1)
Grain Marketing	
Mill. Ind. 102.....	3(3-0)
Wheat and Flour Testing	
Mill. Ind. 203.....	4(1-9)

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SECOND SEMESTER

Clothing I	
Clo. and Text. 101.....	2(1-3)
Costume Design	
Clo. and Text. 106.....	2(0-6)
Textiles	
Clo. and Text. 116.....	3(2-3)
Principles of Art and Their Application	
Ap. Art 206.....	3(3-0)

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General Botany II	
Bot. 105	3(1-4, 2)
Plant Propagation	
Hort. 101	3(2-2, 1)
Forage Crop Production	
Agron. 102	3(2-2, 1)
Dairy Judging	
Dairy Husb. 104.....	1(0-3)
Farm Poultry Production	
Poult. Husb. 101.....	2(1-2, 1)
Principles of Feeding	
An. Husb. 104.....	3(3-0)
Orcharding	
Hort. 107	2(1-2, 1)
Soil Fertility	
Agron. 132	3(2-2, 1)

36

Descriptive Geometry	
Ap. Mech. 158.....	2(0-6)
Perspective, Shades and Shadows	
Arch. 127, 130.....	4(0-12)
Freehand Drawing II	
Arch. 114	2(0-6)

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Wood Working I for High Schools	
Shop 125	2(0-6)
Wood Turning	
Shop 135	2(0-6)
Forging II	
Shop 155	1(0-3)
Forging IV	
Shop 220	1(0-3)
Pattern Making	
Shop 145	1(0-3)
Machine Tool Work II	
Shop 225	2(0-6)
Metallurgy	
Shop 165	2(2-0)
Rural Architecture	
Farm Engr. 102.....	3(0-9)
Surveying I	
Civ. Engr. 102.....	2(0-6)

45

Quantitative Analysis III	
Chem. 251	3(1-6)
Principles of Milling	
Mill. Ind. 101.....	1(0-3)
Milling Practice I	
Mill. Ind. 201.....	3(1-6)
Grain Products	
Mill. Ind. 103.....	2(2-0)
Experimental Baking A	
Mill. Ind. 204.....	2(0-6)
Milling Practice II	
Mill. Ind. 202.....	2(0-6)

Curriculum in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Principles of Typography I Ind. Jour. 101..... 3(2-3)	Principles of Typography II Ind. Jour. 104..... 3(2-3)
Library Methods Lib. Ec. 101..... 1(1-0)	Current History Hist. 126 1(1-0)
Current History Hist. 126 1(1-0)	
Options * 3(-)	Options * 5(-)
Industrial Journalism Lecture... R	Industrial Journalism Lecture... R
Military Science I (Men) Mil. Tr. 101..... 1(0-3)	Military Science II (Men) Mil. Tr. 102..... 1(0-3)
Physical Education M-I Phys. Ed. 103..... (0-2) or	Physical Education M-II Phys. Ed. 104..... (0-2) or
Physical Education W-I Phys. Ed. 151A..... 1(0-3)	Physical Education W-II Phys. Ed. 152A..... 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
English Literature I Engl. 171 4(4-0)	English Literature II Engl. 174 4(4-0)
General Zoölogy I Zoöl. 101 3(2-3) or	General Zoölogy II Zoöl. 102 3(2-3) if <i>General Zoöl. I is chosen the first semester.</i>
General Botany I Bot. 101 3(1-4, 2)	General Botany II Bot. 102 3(1-4, 2) or
	General Microbiology Bact. 101 3(1-6) if <i>General Botany I is chosen the first semester.</i>
Elementary Journalism Ind. Jour. 107..... 2(2-0)	Industrial Writing Ind. Jour. 113..... 2(2-0)
Journalism Practice I Ind. Jour. 110..... 2(0-6)	Journalism Practice II Ind. Jour. 116..... 2(0-6)
Options * 6(-)	Options * 6(-)
Industrial Journalism Lectures... R	Industrial Journalism Lectures... R
Military Science III (Men) Mil. Tr. 103..... 1(0-3)	Mil. Science IV (Men) Mil. Tr. 104..... 1(0-3)
Physical Education M-III (Men) Phys. Ed. 105..... (0-2) or	Physical Education M-IV (Men) Phys. Ed. 106..... (0-2) or
Physical Training W-III (Women) Phys. Ed. 153..... 1(0-3)	Physical Training W-IV (Women) Phys. Ed. 154..... 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Industrial Feature Writing Ind. Jour. 123..... 2(2-0)	Technical Journalism Ind. Jour. 130..... 2(2-0)
Journalism Practice III Ind. Jour. 127..... 2(0-6)	Journalism Practice IV Ind. Jour. 133..... 2(0-6)
Extempore Speech I Pub. Spk. 201..... 2(2-0)	Principles of Advertising Ind. Jour. 125..... 3(3-0)
Options and Electives *.....10(-)	Options and Electives *..... 9(-)
Industrial Journalism Lectures... R	Industrial Journalism Lectures... R

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Circulation and Advertising Promotion Ind. Jour. 201..... 3(3-0)	Editorial Practice Ind. Jour. 207..... 2(2-0)
Copy Reading Ind. Jour. 204..... 2(0-6)	Ethics of Journalism Ind. Jour. 210..... 2(2-0)
Electives and Options *.....11(-)	Electives and Options *.....11(-)
Industrial Journalism Lectures... R	Industrial Journalism Lectures... R

Curriculum in Agricultural Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
General Zoölogy I Zoöl. 101..... 3(2-3)	General Zoölogy II Zoöl. 102 3(2-3)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	General Botany I Bot. 101 3(1-4, 2)
Library Methods Lib. Ec. 101..... 1(1-0)	Military Science II (Men) Mil. Tr. 102..... 1(0-3)
Military Science I (Men) Mil. Tr. 101..... 1(0-3)	Physical Education M-II Phys. Ed. 104..... (0-2) or
Physical Education M-I Phys. Ed. 103..... (0-2) or	Physical Education W-II Phys. Ed. 152A..... 1(0-3)
Physical Education W-I Phys. Ed. 151A..... 1(0-3)	

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry I Chem. 218 4(2-6)	Organic Chemistry II Chem. 219 4(2-6)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus Math. 119 3(3-0)
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Phys. 212 5(4-3)
General Botany II Bot. 102 3(1-4, 2)	Quantitative Analysis Chem. 241 5(1-12)
Business Law I Hist. 153 1(1-0)	Military Science IV (Men) Mil. Tr. 104..... 1(0-3)
Military Science III (Men) Mil. Tr. 103..... 1(0-3)	Physical Education M-IV (Men) Phys. Ed. 106..... (0-2) or
Physical Education M-III (Men) Phys. Ed. 105..... (0-2) or	Physical Education W-IV (Women) Phys. Ed. 154..... 1(0-3)
Physical Education W-III (Women) Phys. Ed. 153..... 1(0-3)	

* The options and electives are chosen with the advice and approval of the Dean. The options are in two general groups, of eighteen semester credits each: (1) social science, and (2) courses related to an industry or applied science. In the tabulated presentation of electives for students in the Division of General Science, on preceding pages, groups may be found that will be accepted as the required option and electives. Group 31 (applied science), group 32 (domestic science), group 33 (domestic art), group 35 (agriculture), group 36 (architecture), or group 37 (manual training), may be chosen in satisfaction of the eighteen hours required related to an industry or applied science. From group 30, eighteen hours are to be chosen in satisfaction of the social science option.

The electives are to be chosen in groups of usually not fewer than eight semester credits, unless they are courses which extend fields already entered through the required subjects or the options.

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Beginning German I Mod. Lang. 103..... 5(5-0)	Beginning German II Mod. Lang. 104..... 2(2-0)
	Scientific German I Mod. Lang. 236..... 3(3-0)
Physical Chemistry Chem. 206 5(3-6)	Inorganic Preparations Chem. 202 2(0-6)
	History of Chemistry Chem. 208 1(1-0)
Agricultural Microbiology Bact. 106 3(1-6)	Food Analysis Chem. 257 3(0-9)
Soils Agron. 131 4(3-3)	Soil Fertility Agron. 132 3(2-3)
	American Government Hist. 151 3(3-0)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Comparative Physiology I Vet. 211 5(4-3)	Economics Econ. 101 3(3-0)
Chem. of Soils and Fertilizers Chem. 252 3(1-6)	Chemistry of Crops Chem. 253 3(1-6)
Electives 7(-)	Electives 10(-)
Thesis R	Thesis R

Curriculum in Biochemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER	SECOND SEMESTER
College Rhetoric I Engl. 101 3(3-0)	College Rhetoric II Engl. 104 3(3-0)
Chemistry I Chem. 101 5(3-6)	Chemistry II Chem. 102 5(3-6)
Plane Trigonometry Math. 101 3(3-0)	College Algebra Math. 104 3(3-0)
General Zoölogy I Zoöl. 101 3(2-3)	General Zoölogy II Zoöl. 102 3(2-3)
Engineering Drawing Ap. Mech. 155..... 2(0-6)	General Botany I Bot. 101 3(1-4, 2)
Library Methods Lib. Ec. 101..... 1(1-0)	
Military Science I (Men) Mil. Tr. 101..... 1(0-3)	Military Science II (Men) Mil. Tr. 102..... 1(0-3)
Physical Education M-I Phys. Ed. 103..... (0-2) or	Physical Education M-II Phys. Ed. 104..... (0-2) or
Physical Education W-I Phys. Ed. 151A..... 1(0-3)	Physical Education W-II Phys. Ed. 152A..... 1(0-3)

SOPHOMORE

FIRST SEMESTER	SECOND SEMESTER
Organic Chemistry I Chem. 218 4(2-6)	Organic Chemistry II Chem. 219 4(2-6)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus Math. 119 3(3-0)
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
General Botany II Bot. 102 3(1-4, 2)	Quantitative Analysis Chem. 241 5(1-12)

SOPHOMORE—Continued

FIRST SEMESTER	SECOND SEMESTER
Business Law I	
Hist. 153 1(1-0)	
Military Science III (Men)	Military Science IV (Men)
Mil. Tr. 103 1(0-3)	Mil. Tr. 104 1(0-3)
Physical Education M-III (Men)	Physical Education M-IV (Men)
Phys. Ed. 105 (0-2) <i>or</i>	Phys. Ed. 106 (0-2) <i>or</i>
Physical Education W-III (Women)	Physical Education W-IV (Women)
Phys. Ed. 153 1(0-3)	Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER	SECOND SEMESTER
Beginning German I	Beginning German II
Mod. Lang. 103 5(5-0)	Mod. Lang. 104 2(2-0)
	Scientific German I
	Mod. Lang. 236 3(3-0)
Physical Chemistry	Inorganic Preparations
Chem. 206 5(3-6)	Chem. 202 2(0-6)
	History of Chemistry
	Chem. 208 1(1-0)
Histology I	General Microbiology
Vet. 221 3(1-6)	Bact. 101 3(1-6)
Comparative Physiology I	American Government
Vet. 211 5(4-3)	Hist. 151 3(3-0)

SENIOR

FIRST SEMESTER	SECOND SEMESTER
Physiological Chemistry I	Physiological Chemistry II
Chem. 232 5(3-6)	Chem. 233 5(3-6)
Organic Preparations	Biochemical Preparations
Chem. 223 5(0-15)	Chem. 234 5(0-15)
Economics	Pathogenic Bacteriology I
Econ. 101 3(3-0)	Bact. 111 4(2-6)
Elective 3(-)	Elective 3(-)
Thesis R	Thesis R

Curriculum in Industrial Chemistry

The Arabic numeral immediately following the name of a subject indicates the number of semester credits; the first numeral within the parentheses indicates the number of hours a week of recitation; the second shows the number of hours a week to be spent at the laboratory exercise; and the third, where there is such, indicates the number of hours a week required for outside work in connection with the laboratory.

FRESHMAN

FIRST SEMESTER.	SECOND SEMESTER
College Rhetoric I	College Rhetoric II
Engl. 101 3(3-0)	Engl. 104 3(3-0)
Chemistry I	Chemistry II
Chem. 101 5(3-6)	Chem. 102 5(3-6)
Plane Trigonometry	College Algebra
Math. 101 3(3-0)	Math. 104 3(3-0)
Engineering Drawing	Descriptive Geometry
Ap. Mech. 155 2(0-6)	Ap. Mech. 158 2(0-6)
Library Methods	Mechanical Drawing I
Lib. Ec. 101 1(1-0)	Ap. Mech. 161 2(0-6)
Woodwork	Business Law I
Shop 101 1(0-3)	Hist. 153 1(1-0)
Forging I	
Shop 150 1(0-3)	
Military Science I (Men)	Military Science II (Men)
Mil. Tr. 101 1(0-3)	Mil. Tr. 102 1(0-3)
Physical Education M-I	Physical Education M-II
Phys. Ed. 103 (0-2) <i>or</i>	Phys. Ed. 104 (0-2) <i>or</i>
Physical Education W-I	Physical Education W-II
Phys. Ed. 151A 1(0-3)	Phys. Ed. 152A 1(0-3)

SOPHOMORE

FIRST SEMESTER.	SECOND SEMESTER
Organic Chemistry I Chem. 218 4(2-6)	Organic Chemistry II Chem. 219 4(2-6)
Plane Analytical Geometry Math. 110 4(4-0)	Calculus Math. 119 3(3-0)
Engineering Physics I Physics 211 5(4-3)	Engineering Physics II Physics 212 5(4-3)
Adv. Inorg. Chemistry Chem. 207 3(3-0)	Quantitative Analysis Chem. 241 5(1-12)
Military Science III (Men) Mil. Tr. 103 1(0-3)	Military Science IV (Men) Mil. Tr. 104 1(0-3)
Physical Education M-III (Men) Phys. Ed. 105 (0-2) <i>or</i>	Physical Education M-IV (Men) Phys. Ed. 106 (0-2) <i>or</i>
Physical Education W-III (Women) Phys. Ed. 153 1(0-3)	Physical Education W-IV (Women) Phys. Ed. 154 1(0-3)

JUNIOR

FIRST SEMESTER.	SECOND SEMESTER
Beginning German I Mod. Lang. 103 5(5-0)	Beginning German II Mod. Lang. 104 2(2-0)
Physical Chemistry Chem. 206 5(3-6)	Scientific German I Mod. Lang. 236 3(3-0)
Fire Assaying Chem. 242 2(0-6)	Inorganic Preparations Chem. 202 2(0-6)
Gas Analysis Chem. 243 1(0-3)	History of Chemistry Chem. 208 1(1-0)
Elective * 3(-)	Industrial Electrochemistry Chem. 205 2(2-0)
	Electrical Engineering C Elect. Engr. 160, 165... 3(2-2, 1)
	Elective * 3(-)

SENIOR

FIRST SEMESTER.	SECOND SEMESTER
American Government Hist. 151 3(3-0)	Economics Econ. 101 3(3-0)
Industrial Chemistry I Chem. 203 5(3-6)	Industrial Chemistry II Chem. 204 5(3-6)
Electives 8(-)	Electives 8(-)
Thesis R	Thesis R

Bacteriology

Professor BUSHNELL
Associate Professor HUNTER
Assistant Professor GAINES

Instructor LIENHARDT
Instructor WITHAM

The Department of Bacteriology occupies parts of the first and second floors of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, a large general laboratory, incubator or temperature room, washroom, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of lectures and printed laboratory directions are furnished the students in some of the courses; in others textbooks are required. The Department library contains textbooks on bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant

disposal of the students for reference. To those who desire graduate work the Department offers excellent facilities.

Bacteriology is presented to the students as a biological science and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. It is now possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitation.

COURSES IN BACTERIOLOGY

FOR UNDERGRADUATES

101. GENERAL MICROBIOLOGY. Sophomore or junior year, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Professor Bushnell and Miss Witham.

This general introductory course consists of lectures, recitations and demonstrations covering the morphological and biological characters, the classification and the distribution of bacteria, factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technic. During the last half of the semester, organisms representing the different families and genera are studied microscopically and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

106. AGRICULTURAL MICROBIOLOGY. Junior year, both semesters. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Professor Bushnell and Miss Witham.

This is a general course consisting of lectures, recitations and demonstrations. The relation of microorganisms to agriculture is particularly emphasized. First, information is given concerning the nature of microorganisms; their biological characteristics, classification and distribution in nature; their influence upon the plant food in the soil; their relation to certain fermentations, etc. Later some emphasis is placed upon the relation of microorganisms to disease; sources and modes of infection; use of germicidal agents and general hygienic measures.

Laboratory.—In the laboratory, the student becomes familiar with methods of cultivating and studying bacteria, yeasts and molds. Various known forms are studied; methods for the quantitative and qualitative analysis of water, milk, etc., are given some attention. Some time is given to methods of sterilization and the use of germicidal agents. The aim of this course is to give the student a general working knowledge of the subject and to point out its relation to agriculture and the problems of everyday life.

111. PATHOGENIC BACTERIOLOGY I. Sophomore year, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Chemistry II. Professor Bushnell.

This is primarily a general introductory course, consisting of lectures, demonstrations and recitations covering the distribution, the morphological and biochemical features of microorganisms; factors necessary for the development and cultivation of bacteria and the fundamental principles of the science as applied to veterinary medicine.

Laboratory.—The student first becomes acquainted with the general laboratory technic, comprising the preparation of media, methods of sterilization, incubation, inoculation, plating, isolating, and staining of bacteria. Different cultures of microorganisms are studied morphologically, culturally and biochemically. A quantitative and qualitative examination of milk and water is made in the latter part of the semester.

116. PATHOGENIC BACTERIOLOGY II. Junior year, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: Pathogenic Bacteriology I. Professor Bushnell.

A study is made of the morphology, powers of resistance, pathogenesis, distribution, channels of infection, and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; epizootic and epidemic diseases of unknown etiology are further treated. A detailed study is made of the manufacture, standardization, preparation for the market and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention, and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; prevention and treatment of specific infectious diseases. Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolyticins; experiments showing the constitutions and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technique, etc., comprise the laboratory work.

121. HOUSEHOLD MICROBIOLOGY. Junior year, both semesters. Lectures, three hours; laboratory, six hours. Five semester credits. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Miss Witham.

This course consists of lectures, recitations and demonstrations relating to the classification, distribution and the relative importance of bacteria. The morphological and biochemical characters of microorganisms are considered, together with a study of those factors necessary for the proper development of bacteria, and the fundamental principles of the science as applied to household economics. It is designed to give the student a more thorough knowledge of those microorganisms which are of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances are studied in detail. Some time is given to the principles of sanitation as applied to public-health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—General laboratory technique is first taken up, consisting of preparation of media, methods and principles of sterilization, incubation, plating, isolating and staining of microorganisms. Studies consisting of the morphological, cultural, and biochemical characteristics of different organisms are made. A study of microorganisms and their activities, both beneficial and harmful, in their relation to household economy; bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; micro-

scopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are topics taken up in the laboratory work.

FOR GRADUATES AND UNDERGRADUATES

201. SOIL MICROBIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Bacteriology. Assistant Professor Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria.

206. HYGIENIC BACTERIOLOGY. Elective, first semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Professor Bushnell.

Pathogenic bacteria, especially those related to disease of man; channels of infection, and means of dissemination of pathogenic bacteria; epidemics, their cause and control; isolation, disinfection, and quarantine; prophylaxis against specific infectious diseases and important precautions necessary in the control of communicable diseases are studied. Various books are recommended as textbooks.

Laboratory.—The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of *Bacterium tuberculosis* in sputum; the culture of pathogenic anaerobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

211. DAIRY BACTERIOLOGY. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General, Agricultural, or Household Microbiology. Professor Bushnell.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory.—The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms representing the flora of milk, butter, and cheese; types of milk-fermenting organisms; the examination of cream, wash water, and separator slime; the effect of temperature on the growth of milk bacteria; pasteurization of milk; examination of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

216. POULTRY BACTERIOLOGY. Elective, first semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General or Agricultural Microbiology. Professor Bushnell.

Consideration is given to the various microbial diseases of poultry; etiology, sources, and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

Laboratory.—Microorganisms pathogenic for poultry; artificial production, diagnosis, and control of poultry diseases; microbial content of eggs and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work.

221. WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, second semester. Lectures, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Microbiology, or Household Microbiology. Professor Bushnell.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

Laboratory.—The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of samples of water and sewage; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

FOR GRADUATES

301. RESEARCH BACTERIOLOGY. Elective, both semesters. Credit to be arranged. Prerequisite: The student must have credit in at least two of the outlined courses offered by the Department. Professor Bushnell.

Advanced students showing sufficient training, ability, and interest in original research may be admitted to this course, upon approval of the head of the Department. The student will be under the direct supervision of a faculty member of the Department and in consultation with him the subject for investigation will be chosen and outlined.

Botany

Professor ROBERTS
Associate Professor MELCHERS, in charge
Associate Professor MILLER

Assistant Professor DAVIS
Instructor HAYMAKER
Instructor DALBEY

The instruction given in the Department of Botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students with the meaning and relations of the manifold forms of plants and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, opportunities are offered to secure a broad and thorough training in the courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work

with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany lies in the investigation of those economic problems in plant life which affect agriculture. Three distinct general lines of work in botany are being conducted in the Experiment Station: Experimental plant breeding; the investigation, prevention and control of plant diseases; and physiological investigations in drouth-resistance in forage plants.

The equipment for elementary instruction comprises sixty compound and sixty-four simple microscopes, a series of Jung, Peter, Kony, and Frank botanical charts, a lantern-slide projection apparatus, and a very full collection of preserved material for general morphology and plant pathology. For advanced work, Zeiss, Spencer, and Bausch and Lomb microscopes, with apochromatic lenses, a filar micrometer, Bausch and Lomb and Spencer camera lucidas, two Zeiss binocular microscopes, and Bausch and Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff and graduate students. A Minot precision microtome, two Spencer microtomes, electric and gas embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological studies.

In physiology a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available.

For investigations in plant pathology and plant physiology in the Experiment Station, a large laboratory is equipped with apparatus for studying normal and abnormal conditions in plants. The apparatus used for making determinations of fungous and bacterial diseases of plants, and for the study of the life histories of pathogenic organisms, consists in part as follows: three compound microscopes, a Bausch and Lomb binocular monobjective compound microscope, a Spencer binocular microscope, analytical balances, drying ovens, hot-air sterilizers, steam autoclave, steam still, a Frease electric incubator, a Thelco low-temperature incubator, five Chicago electric incubators, transfer chambers for isolating organisms, pathological tables, research desks, a large supply of glassware for culturing fungi, two soil and air thermographs, a very complete herbarium, containing the various genera and species of fungi, and a large and representative collection of preserved specimens, illustrating the economic plant diseases.

For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

COURSES IN BOTANY

FOR UNDERGRADUATES

101. GENERAL BOTANY I. Freshman year, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Professor —, Associate Professor Miller, Assistant Professor Davis, Mr. Haymaker, and Miss Dalbey.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. Text: Ganong's *A Textbook of Botany for Colleges*.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity. Laboratory outlines are furnished by the Department.

102. GENERAL BOTANY II. Freshman and sophomore years, both semesters. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany I. Professor ———, Associate Professor Miller, Assistant Professor Davis, Mr. Haymaker, and Miss Dalbey.

This is a course of lectures, combined with special study of a required text and with reference reading. The principal life functions of plants, responses of plants, such as photosynthesis, digestion, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, is studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key. Text: Ganong's *A Textbook of Botany for Colleges*.

Laboratory.—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the Department.

106. BOTANY. Junior year, second semester. Class work, one hour; laboratory, six hours.† Three semester credits.

This is a condensed course in general botany. In so far as the time allows, a study is made of the morphology of a few of the chief great groups of plants, of their elementary physiology and their anatomical structures, particularly with reference to the functioning of plant life. The latter portion of the course is devoted to a systematic study of the most important plant families, in which their floral structures are considered. Time is devoted to the tracing out of unknown wild flowers by means of a key, so that a student will be able to familiarize himself with the flora of any community where he may be. This course is designed to afford a sufficient foundation for teaching botany in a high school.

107. PLANT PATHOLOGY I. Sophomore year, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Associate Professor Melchers and Mr. Haymaker.

The diseases affecting the chief economic crops of field, orchard and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are considered. The student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm, in the nursery, and in market-garden work. Non-

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

† Two of the required laboratory hours will be used for report writing outside of the regular laboratory period.

parasitic and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the fungi, the life histories of which are studied in some detail. Preventive measures are considered in each case. An extensive collection of preserved pathological material is available. Text: *Fungous Diseases of Plants*, by H. M. Duggar.

Laboratory.—Practical work in the recognition of all the more common plant diseases of the farm, orchard and garden is accompanied by detailed microscopic studies of disease tissues and identification of the fungous pathogenes which cause them. Laboratory outlines are furnished by the Department.

108. PATHOLOGY OF VEGETABLE FOOD PRODUCTS. Elective, second semester. Class work, one hour; laboratory six hours.† Three semester credits. Prerequisite: High-School Botany, or its equivalent. Miss Dalbey.

This course is designed primarily for students in the Division of Home Economics and General Science. It deals with fungous and bacterial diseases and other maladies, commonly recognized as the cause of decay or other deterioration in plant products, particularly in fruits and vegetables. The course offers opportunity to become familiar with the knowledge necessary for recognizing at sight the presence of fungi in fruits and vegetables as they occur on the market. The course aims to place emphasis on the presence of such infection and the results that can be expected when such products are bought on the market and stored under ordinary conditions.

Laboratory.—The laboratory work comprises a study of the organisms causing decay in plant food products. Attention is given to conditions affecting the growth and dissemination of the organism, especially temperature and light conditions, and points out the necessary precautions in preventing loss of food products through decay. Exercises are devoted to the proper way to select, buy and store vegetables and fruit as they occur on the market. A study of these will be made in the laboratory, since much of the laboratory material is obtained from the local markets. In addition to this an extensive collection of preserved material is available in the department. Laboratory outlines are furnished by the Department.

113. MEDICAL BOTANY. Sophomore year, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: High-school botany or its equivalent. Miss Dalbey.

This is a lecture, laboratory and reading course dealing with poisonous plants. The lecture includes a study of the principal stock-poisoning plants of the range; losses due to native poisonous plants, methods of identification, habitat, poisonous properties, and methods of control and elimination.

Laboratory.—The laboratory work follows the work presented in the lectures, and consists chiefly of a study of the native poisonous plants of the West, the identification of these plants by means of a descriptive key, and a scientific study of conditions of stock poisoning.

FOR GRADUATES AND UNDERGRADUATES

201. PLANT PATHOLOGY II. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Pathology I. Associate Professor Melchers.

The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

† Two of the required laboratory hours will be used for report writing outside of the regular laboratory period.

classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi and their morphology; it is essential for those who wish to follow plant pathological work professionally.

Laboratory.—The laboratory work consists of a detailed study of the genera of pathogenic fungi. A large supply of plant-disease material in the department furnishes a basis for these studies.

202. FRUIT CROP DISEASES. Elective, first semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Mr. Haymaker.

The class work consists of a series of lectures dealing with diseases affecting fruit crops of all kinds. Special emphasis is laid on measures and methods for controlling these diseases by means of spraying, sanitation, and varietal resistance. The preparation and practical application of the standard sprays is considered. Text: *Manual of Fruit Diseases*, by Hesler and Whetzel.

Laboratory.—This consists of detailed study of each disease affecting the major fruit crops, together with a detailed microscopic study of the organisms causing the disease. The course is especially valuable for those studying horticulture or those expecting to specialize in plant pathology.

203. FIELD CROP AND VEGETABLE DISEASES. Elective, second semester. Class work, one hour; laboratory, three hours.† Two semester credits. Prerequisite: Plant Pathology I. Associate Professor Melchers.

The class work consists of a series of lectures dealing with the historical development of phytopathology, with special emphasis on literature pertaining to field-crop and vegetable diseases. The field symptoms are discussed, varietal susceptibility and resistance are considered, and control measures are advised.

Laboratory.—This consists of a detailed microscopic study of the plant diseases attacking field crops and vegetables, and is of value to those who wish to pursue agronomic or horticultural work, and is especially designed for those students who expect to specialize in plant pathology.

205. PLANT BREEDING. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite:

General Botany II. Professor ———.

This subject involves a study of the present knowledge of variation and heredity, as applied to the breeding and improvement of economic plants. The history of the principal theories bearing upon genetic problems is reviewed, and the experimental data are critically considered. The principles underlying the behavior of hybrids are discussed. A survey is given of the practical results achieved in the breeding of plants, together with a scientific analysis of the methods used. Text: *Genetics*, by H. E. Walker, supplemented by lectures and reference reading.

Laboratory.—The course begins with a thorough study of the cell, followed by a study of the homeotypic and heterotypic mitoses, chiefly in *Lilium*, *Erythronium*, and *Ascaris*. This is succeeded by an examination of floral mechanisms, with reference to close- and cross-pollination, followed by biometric work in variation and correlation, and practical work in the calculation of the chief constants of the frequency polygon. The course closes with a laboratory study of Mendelian phenomena.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

† One of the required laboratory hours is employed in lecture and laboratory quizzes and reviews.

208. PLANT PHYSIOLOGY I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: General Botany II. Associate Professor Miller and Assistant Professor Davis.

This course offers opportunity for advanced work through lectures, discussions and reference reading of the more special problems in plant physiology.

211. PLANT GENETICS I. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Breeding. Professor ———.

The work of Plant Breeding is continued, with special reference to the practical details, technique and history of the breeding of the principal economic plants. Extensive reference reading in the literature is required and a thesis involving a review of the work accomplished in some phase of genetics.

Laboratory.—Experimental work is carried on in hybridization, using a considerable variety of forms in order to acquire familiarity with the technique of crossing, and with the range of phenotypic characters in the species available for investigation. Crosses are made of antithetic characters, using plant material of known behavior.

215. PLANT HISTOLOGY. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisite: General Botany II.

This course is planned to provide a thorough training in the principles and practice of microtechnical methods in botany, including the killing, fixing and embedding of plant material, microtome work, and the staining and mounting, by various methods, of a tolerably complete and characteristic series of permanent slides, representing the vegetative and reproductive tissues of typical plants, taken from all the principal groups. Text: Chamberlain's *Plant Histology*.

219. ECONOMIC BOTANY. Elective, first semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: General Botany II. Professor ———.

This course is designed especially for students intending to enter professional work in botany in experiment stations. It involves a study of the history of cultivated plants, with a course of lectures on the chief groups of the higher plants containing economic species. In this connection a very broad survey is taken of the world's economic plants, considerable attention being given to the derivation of economic products, and to methods of cultivation and harvesting. The plants of tropical and subtropical agriculture and horticulture receive considerable attention. Forestry products are not considered. Instruction is imparted by lectures and reference reading. Text: *The Origin of Cultivated Plants*, by De Candolle.

Laboratory.—A microscopic study is made of economic plant products, such as fibers and textiles, food products, spices, etc. Laboratory outlines are furnished by the Department.

222. EVOLUTION OF PLANTS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Economic Botany. Professor ———.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phyla and to the probable derivation of the chief groups of plants. Instruction is imparted by means of lectures and reference readings. Text: *Evolution of Plants*, by Campbell.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

225. TAXONOMIC BOTANY. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite; General Botany II. Professor ———.

This course is designed to give biological students a broad training in the systematic relationships, chiefly of the flowering plants. Practice is acquired in the use of manuals or keys to floras, and the student is taught especially to recognize the morphological characters which distinguish the principal orders, families, and genera of the angiosperms. The course is designed to be a strictly practical one, its purpose being to equip the students with the necessary data for recognizing at sight a large number of the plants of the field.

Laboratory.—By means of standard manuals and floras, a large number of native and exotic plants are identified. Considerable field practice is required, and attention is directed to differences in structure which the same species may show under different environments. An endeavor is made to train the student's mind to a broad, comprehensive conception of species-characters, using manuals merely as convenient guides to this end. Laboratory guide: Grey's *Manual of Botany*, seventh edition, revised.

FOR GRADUATES

301. PLANT PATHOLOGY III. Elective, second semester. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology II. Associate Professor Melchers.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organisms which cause plant disease. The course will include a somewhat detailed study of the cryptogamic herbarium. Considerable attention will be devoted to the growing of pure cultures of pathogenic fungi, the making of inoculations, isolations of fungi, etc. The preparation of media of various kinds for the growing of fungi will receive considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

302. PLANT PATHOLOGY IV. Elective, first and second semesters. Laboratory, nine hours.* Three semester credits. Prerequisite: Plant Pathology III. Associate Professor Melchers.

This course involves original research. Problems are chosen by the student along some lines in which he is interested. A carefully worked-out report which summarizes the investigation undertaken, is required at the end of the semester.

303. PLANT GENETICS II. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Genetics I. Professor ———.

A more advanced study of fundamental problems in genetics. Such topics as the cytological basis of heredity, mutation and the questions of sex-inheritance and the inheritance of acquired characters receive extended treatment. A reading knowledge of German is required. Baur's *Experimentelle Vererbungslehre*, second edition, is read in class, and extensive topical reference reading is required in other German handbooks, and in the original literature.

Laboratory.—Experimental work in hybridization, carried on in the greenhouse is continued in this course.

307. PLANT GENETICS III. Elective, second semester. Class work, one hour; laboratory, six hours.* Three semester credits. Prerequisite: Plant Genetics II. Professor ———.

* Two of the required laboratory hours are employed in lecture and laboratory quizzes and reviews.

The work of the preceding course is continued in general character, except that individual problems begin to be developed. A reading knowledge of German is required.

Laboratory.—Problems in plant genetics are taken up individually and hybrids are investigated experimentally.

Chemistry

Professor KING
Associate Professor SWANSON
Associate Professor NEWMAN
Associate Professor HUGHES
Associate Professor BRUBAKER
Instructor WEST
Instructor HARRISS

Instructor KEITH
Instructor DOW
Instructor DOISY
Assistant _____
Fellow MITCHELL
Fellow SMITH

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observation by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 864 students each semester in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 324 students, and are well supplied with general and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry. In all of the laboratory work the student is required to give the designated amount of time, and at least a certain amount of work must be satisfactorily performed in order to obtain credit.

COURSES IN CHEMISTRY

FOR UNDERGRADUATES

101. CHEMISTRY I. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: High-school physics. Professor King, Associate Professor Newman, Mr. West, Miss Harriss, Mr. Keith, Miss Dow, Mrs. Doisy, Miss Mitchell, and Mrs. Smith.

This work begins the study of general chemistry, and is designed, with that of the succeeding semesters, to give the student a knowledge of the

fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. McPherson and Henderson's *A Course in General Chemistry* is used as a textbook, this semester's work covering the first 331 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena, and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

102. CHEMISTRY II. Freshman year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry I. Teachers same as for Chemistry I.

The work in this course for the first half of the semester is a completion of the study of general chemistry begun the preceding semester. The second half of the semester is devoted to the study of the general principles of qualitative analysis as outlined in an *Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of single substances and mixtures. The effect of the course is to broaden, strengthen, and unify the students' ideas of general chemistry.

105. CHEMISTRY AV-I. Freshman year, first semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Mr. Keith.

This course deals with the fundamental laws and theories of chemistry, the elements and their inorganic compounds, and lays emphasis on the application of chemistry to the arts and industries. Both the metals and nonmetals are studied, but the treatment is less detailed than in Chemistry I and II.

Laboratory.—The laboratory work is intended to give the student training in manipulation and first-hand knowledge of the important laws of chemistry and the properties of substances studied, by use of appropriate experiments which the student himself performs.

106. CHEMISTRY V-II. Freshman year, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry AV-I. Mr. West.

This course follows Chemistry AV-I and has the same general object, but deals with the organic compounds.

Laboratory.—The laboratory work consists in the preparation of certain organic compounds and qualitative study of their properties.

107 and 108. CHEMISTRY E-I and E-II. Freshman year, both semesters. Lectures and recitations, three hours; laboratory, three hours. Four semester credits each. Prerequisites and teachers same as for Chemistry I and II.

These courses cover the work of the general chemistry and qualitative analysis. The relative amount of time spent upon these subjects is the same as in Chemistry I and II with the exception of the laboratory. Instead of spending six hours a week in laboratory, students in these courses spend three hours. Throughout all the work in these courses emphasis is placed upon those phases of chemistry which have a special bearing upon engineering materials. Texts: Same as for Chemistry I and II.

120. ORGANIC CHEMISTRY. Sophomore year, both semesters and summer school. Lectures and recitations, two hours; laboratory, three hours. Three semester credits. Prerequisite: A college course in general chemistry. Assistant Professors Hughes and Brubaker, and Mr. West.

A systematic study is made of the simpler examples, of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes experiments and preparations touching the more important compounds studied in the lectures and recitations, especially fats, carbohydrates and proteins.

121. ORGANIC CHEMISTRY HE. Sophomore year, both semesters and summer school. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisites and teachers same as for Organic Chemistry.

The lectures and recitations in this course are the same as in Organic Chemistry, with additional emphasis placed on the organic compounds most intimately related to daily life in the home. Text: Norris's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

Laboratory.—The laboratory work includes preparations, and qualitative and quantitative experiments touching the more important compounds studied in the lectures and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants, and other materials used in and about the home. Laboratory guide: *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

150. QUANTITATIVE ANALYSIS I. Sophomore year, both semesters. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Assistant Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

FOR GRADUATES AND UNDERGRADUATES

202. INORGANIC PREPARATIONS. Junior year and elective, both semesters. One semester credit for each three hours of laboratory work. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

Students of Advanced Inorganic Chemistry are advised to take this course. It consists in the preparation and purification of some typical inorganic compound, together with those of more complex composition and compounds of the rarer elements.

203 and 204. INDUSTRIAL CHEMISTRY I and II. Senior year and elective, first and second semesters, respectively. Given in 1919-'20 and alternate years thereafter. Class work, three hours; laboratory, six hours. Five semester credits each semester. Prerequisite: Organic Chemistry. Professor King and Mr. ———.

This course treats the more important technical processes. Considerable attention is given to general operations and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalies, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch and the products of fermentation and the destructive distillation of wood and coal. Textbook: *Manual of Industrial Chemistry*, by Rogers and Aubert.

205. INDUSTRIAL ELECTRO-CHEMISTRY. Junior year and elective, second semester. Offered in 1918-'19 and alternate years thereafter. Class work, two hours. Two semester credits. Prerequisite: College courses in general chemistry and physics. Associate Professor Brubaker.

In this course are treated briefly the principles of voltameters, electrochemical methods of analysis, electroplating, electrotyping, and the production of metallic objects by electroplating methods. This is followed by fuller treatment of electrolytic refining of metals, the manufacture of various industrial products by electrolytic methods, primary cells, the lead storage battery, the Edison storage battery, the electrometallurgy of iron and steel, and the fixation of atmospheric nitrogen. Textbook: Thompson's *Applied Electrochemistry*.

206. PHYSICAL CHEMISTRY. Junior year, first semester. Given in 1918-'19 and alternate years thereafter. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

207. ADVANCED INORGANIC CHEMISTRY. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Given in 1918-'19 and alternate years thereafter. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

The course consists of a thorough study of the facts of chemistry and their theoretical interpretations according to the views of the present day. Special stress is placed upon the properties of the elements as a basis for methods of classification, and upon the rarer elements and compounds. Text: *Modern Inorganic Chemistry*, by J. W. Mellor.

208. HISTORY OF CHEMISTRY. Junior year, second semester. Lecture work, one hour. One semester credit. Prerequisite: Physical Chemistry. Professor King.

These lectures deal with the history concerning the development of the principal laws and theories of chemistry, special emphasis being placed upon the failures and triumphs of the founders of chemical science.

218 and 219. ORGANIC CHEMISTRY I AND II. Sophomore year, first and second semesters, respectively. Lectures and recitations, two hours; laboratory, six hours. Four semester credits each. Prerequisite: College course in organic chemistry. Associate Professor Hughes and Mr. West.

This course includes a careful, systematic study of aliphatic and aromatic compounds to such an extent as time permits. Text: Perkin and Kipping's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparation and purification of a number of compounds selected from the aliphatic and aromatic series for the illustration of important synthetic reactions. In addition to the verification of the constants of these compounds the important qualitative tests are made which are characteristic of the classes of compounds. Laboratory guide: Jones's *A Laboratory Outline of Organic Chemistry*.

223. ORGANIC PREPARATIONS. Senior year, first semester. Laboratory work, fifteen hours. Five semester credits. Prerequisite: Organic Chemistry II. Associate Professor Hughes.

The compounds prepared in this course are so chosen as to give the student a thorough knowledge of the fundamental principles of synthetic organic chemistry.

230. PRINCIPLES OF ANIMAL NUTRITION. Elective and graduate, second semester. Class work, three hours. Three semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course gives a thorough study of the relations of animals to matter and energy, and the physiological principles involved. Study of the researches which have established the principles of nutrition constitutes the ground work of the course.

231. PHYSIOLOGICAL CHEMISTRY. Elective and graduate, second semester. Lectures and recitations, three hours; laboratory, six hours. Five semester credits. Prerequisite: An acceptable course in organic chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or in one of the biological sciences. It is a systematic study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances, and their general specific functions; the changes that take place in digestion, assimilation and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism, and the interrelations of organs, are among the important topics studied. Text: Mathews' *Physiological Chemistry*.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the lectures and recitations. Laboratory guide: Mathews' *Physiological Chemistry*.

232. PHYSIOLOGICAL CHEMISTRY I. Senior year, first semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Organic Chemistry. Associate Professor Hughes.

This course is designed to meet the needs of students who expect to specialize in nutrition or one of the biological sciences. It treats of the chemistry of carbohydrates, lipins and proteins, and the chemical changes which these undergo during the processes of digestion and metabolism.

Laboratory.—The laboratory work is designed to familiarize the student with the compounds and processes discussed in the class work.

233. PHYSIOLOGICAL CHEMISTRY II. Senior year, second semester. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisite: Physiological Chemistry I. Associate Professor Hughes.

This is a continuation of Physiological Chemistry I. It includes the chemistry of the body tissues and excretions.

Laboratory.—The laboratory work includes a qualitative and quantitative study of the tissues and excretions discussed in the class work.

234. BIOCHEMICAL PREPARATIONS. Senior year, second semester. Laboratory work, fifteen hours. Five semester credits. Prerequisite: Organic Chemistry II and Physiological Chemistry I. Associate Professor Hughes.

This course includes the isolation, purification, and analysis of a number of compounds which are of importance in biochemistry and nutrition.

235. PATHOLOGICAL CHEMISTRY. Elective and graduate. Class work, two hours. Two semester credits. Prerequisite: An approved course in physiological chemistry. Associate Professor Hughes.

This course presents the chemical facts pertaining to abnormal nutritional processes. The chemical factors involved in the causation progress and results of disease are discussed under the following heads: inflammation, degeneration, infection, anemia, tuberculosis, dyspepsia, typhoid fever, jaundice, nephritis, diabetes, gout, rheumatism, intoxication, etc.

240. ADVANCED QUALITATIVE ANALYSIS. Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Newman.

This course is designed to broaden the student's knowledge of chemistry by a systematic study of the properties of the acid and basic elements and their compounds as shown in a detailed study of systematic analysis. Many of the rarer elements are included. A study of the application of chemical theory to analytical reactions is taken up in considerable detail with the aim of familiarizing the student with the important theories as applied to analytical procedure. Reports are made on assigned reference work.

241. QUANTITATIVE ANALYSIS. Sophomore year, second semester. Class work, one hour; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or its equivalent. Associate Professor Brubaker.

The subject matter considered in this course is practically the same as that given in courses 250 and 251.

242. FIRE ASSAYING. Junior year, first semester. Laboratory work, six hours. Two semester credits. Prerequisite: Quantitative Analysis. Associate Professor Newman.

In this course the student becomes familiar with the ordinary methods of fire assaying. Some attention is also paid to wet assaying. Fire assays of ores containing metals such as copper, zinc, lead, bismuth, tin, silver and gold are made.

243. GAS ANALYSIS. Junior year, first semester. Laboratory work, three hours. One semester credit. Prerequisite: Quantitative Analysis. Associate Professor Brubaker.

The work in this course acquaints the student with the use of standard apparatus in the analysis of gases. Analyses of air, flue and furnace, and illuminating gases are made.

245. MICROCHEMICAL METHODS OF ANALYSIS. Elective and graduate. Laboratory, three hours. One semester credit. Prerequisites: Elementary Organic Chemistry, and Quantitative Analysis I. Associate Professor Brubaker.

The microscope is a very useful instrument in chemical analyses. The technical chemist finds it indispensable, and its applications are steadily increasing. The object of this course is to teach the student the various methods of using the microscope in chemical analysis, both qualitative and quantitative, applied to both inorganic substances and to vegetable or animal products.

250. QUANTITATIVE ANALYSIS II. Elective and graduate, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Chemistry II. Associate Professor Brubaker.

This course covers the general procedure of gravimetric analysis and volumetric analysis, together with a discussion of chemical theory as applied to quantitative reactions. Particular attention is paid to the commercial significance of the procedures studied. The work for the first part of the semester consists of a selected series of gravimetric determinations designed to develop accuracy in a number of fundamental operations. During the second part of the semester, solutions of acids, bases and oxidizing agents are standardized and used in analysis. Reports are made on assigned reference work for the study of methods of analysis not taken up in class. Textbook: *Quantitative Analysis*, by Edgar G. Mahin.

251. QUANTITATIVE ANALYSIS III. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis II. Associate Professor Brubaker.

This is a continuation of Quantitative Analysis II, and applies the fundamental principles of quantitative work to the analysis of important industrial products and raw materials, including paints, soap, oils, bituminous materials, coal, gas, water, iron and steel, and other substances, the choice of the work being determined by the instructor in consultation with the student. The chemical theories underlying the methods used are also considered in some detail. Textbook: *Quantitative Analysis*, by Edgar G. Mahin. Other standard works on quantitative analysis are used as references.

252. CHEMISTRY OF SOILS AND FERTILIZERS. Senior year, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

The class work takes up the chemical composition of soils and fertilizers, and those chemical changes in the soil which are most important in affecting plant growth. Attention is also given to colloids and soluble salts in relation to optimum soil conditions. The course is adapted especially to the needs of students of soils.

Laboratory.—The laboratory work is planned to give the student a knowledge of the most important chemical methods used in the analysis and investigation of soils and fertilizers.

253. CHEMISTRY OF CROPS. Senior year, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

In the class work a detailed study is made of the chemical composition of substances present in plants and plant products; the most important chemical transformations which take place in plant growth; and enzymes and colloids in relation to plant substances and plant growth.

Laboratory.—The laboratory exercises are planned to give the student a working knowledge of the most important methods used in the analysis and investigation of substances present in plants and plant products.

254. DAIRY CHEMISTRY. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work is centered chiefly upon the following: A detailed study of the chemical compounds present in milk, butter, cheese, and other dairy products; chemical changes affected by conditions of handling dairy products; a review of literature relating to recent investigational work in dairy chemistry.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of dairy products.

255. CHEMISTRY OF MEATS. Elective and graduate, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry, and Quantitative Analysis I. Associate Professor Swanson.

The class work includes the following: A detailed study of the chemical compounds present in the edible portions of meat animals; chemical changes effected by different methods of preparing and storing meat products; a review of recent literature relating to investigational work in the chemistry of meat and meat products.

Laboratory.—The laboratory exercises are designed to give the student a working knowledge of the most important chemical methods used in the analysis and investigation of meats and meat products.

256. CHEMICAL RESEARCH. Excellent opportunities are offered students to undertake research work in chemistry. Such work is constantly being conducted in the laboratories of the department in connection with the Agricultural and Engineering Experiment Stations. The State food laboratory and the laboratories for analysis of feeds and fertilizers are also accessible to students desiring research along such lines. Much emphasis is placed upon research in the department, and all students whose training is adequate are encouraged to participate. Work is offered in the following lines:

Agricultural Chemistry. Associate Professor Swanson.

Applied Analytical Chemistry. Associate Professors Newman and Brubaker, and Assistant Professor Latshaw.

Applied Organic Chemistry.

Biochemistry. Associate Professor Hughes and Assistant Professor Hogan.

Applied, General, and Physical Chemistry. Professor King.

257. FOOD ANALYSIS. Junior year, second semester. Laboratory work, nine hours. Three semester credits. Prerequisites: Organic Chemistry, and Quantitative Analysis I. Associate Food Analyst Campbell.

This course includes the quantitative methods employed in the analysis of the various kinds of foodstuffs. It also includes practice in testing for the presence of adulterants, preservatives, and coloring materials.

260. ADVANCED QUANTITATIVE ANALYSIS. Junior year and elective, first semester. One credit for each three hours of laboratory work. Prerequisites: Quantitative Analysis I, or Quantitative Analysis II and III. Assistant Professor Brubaker.

Under this heading provision is made for the election of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories afford a large opportunity for advanced work.

265. HOUSEHOLD CHEMISTRY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Assistant Professor Brubaker.

The lectures cover the chemistry of numerous problems of air, water, soap, laundering, dry cleaning, food and cookery, and textiles. A portion of the lecture time is given to reciting on the subject matter of previous lectures and of the laboratory work. References are given for study.

Laboratory.—The laboratory work consists largely of quantitative exercises dealing with air, water, soap, foods, food accessories, and textiles.

275. CHEMISTRY SEMINAR. Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

Economics and Sociology

Professor KAMMEYER
Associate Professor MERRITT

Vocational training alone does not fully prepare a student for his life work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the economic and social conditions under which he will live and work, in order that he may become a useful member of society. The State needs men and women trained for citizenship. It is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology and statistics is at the disposal of the students, and is used for collateral readings, book reviews and reports.

COURSES IN ECONOMICS

FOR UNDERGRADUATES

101. ECONOMICS. Junior and senior years, both semesters. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a course in the fundamentals of economic science, including a study of man's wealth-getting and wealth-using activities as they manifest themselves in the consumption, production, exchange, and distribution of commodities and services. Budgets, factors and expenses of production, money, banking, wage systems, labor organizations, rent, interest and profits are some of the leading topics for study and class discussion. These phenomena are here studied in conjunction with the laws or social conventions which control or influence them, such as the federal-reserve systems, the farm-loan act, legal restrictions concerning commerce, strikes, child labor, trusts, monopolies, and the like. The application of economic principles to such subjects as taxation, socialism, insurance, etc., is also considered. Supplementary reading of current literature, reference books, the keeping of notes, and periodical written reports are required. A combination of the textbook and lecture methods is followed. Text: Ely's *Outlines of Economics*.

FOR GRADUATES AND UNDERGRADUATES

204. BUSINESS ORGANIZATION. Senior year and elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Economics. Associate Professor Merritt.

Individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions are studied in this course. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, to cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports. Text: Briscoe's *Economics of Business*.

207. LABOR PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Associate Professor Merritt.

The history, organization, functions, and legal status of labor unions in the United States and in the principal countries in Europe are discussed. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. The course also includes a study of the various plans that have been proposed and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, industrial partnership, etc. Instruction is by lectures, assigned readings, and reports. Text: Groat's *Organized Labor in America*.

210. MONEY AND BANKING. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

The first half of this course is devoted to a study of the nature, history and functions of money; its place as a factor in man's economic progress, and its importance as such in his business activities as organized to-day; money standards and systems, monometallism, bimetallism, limping standard, paper standard, gold-exchange standard; coinage and coinage laws; instruments of credit, bills of exchange, drafts; clearing houses. The second half of the course takes up the subject of banking. Banking in its historic forms is briefly considered as a preparation for a more detailed study of the federal-reserve system, the federal farm-loan system, and state banks, particularly Kansas state banks. To this is added a study of savings banks, trust companies, building and loan associations and other institutionalized forms of credit. Instruction is by lectures and reports. Any acceptable text, such as White's *Money and Banking*, may be used as a manual.

213. PUBLIC FINANCE. Elective, second semester. Class work, two hours. Two semester credits. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems, reforms needed, public indebtedness, budgets, and other phenomena of financial administration. Plehn's *Introduction to Public Finance* is used as a basis for recitations. This is supplemented by library work and reports.

216. ECONOMIC GEOGRAPHY. Elective, first semester. Class work, three hours. Three semester credits. Professor Kammeyer.

This is a discussion of the important facts of the economic world as they are influenced by geographical conditions and a study of production and trade as influenced by geographical conditions. The geography of the more important commercial products of farm, range, forest, mine, factory, and sea; transportation and manufactures; great commercial and manufacturing centers, and types of commercial nations are considered. Stress is given to the natural resources of the United States as factors in the national development. This includes the current movement to conserve natural resources; the improvement and extension of waterways; the control of water power and water supply. Instruction is imparted by lectures, library work, and study of a text.

219. BUSINESS MANAGEMENT. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Associate Professor Merritt.

Plant location and structure; the organization and management of industrial forces; distribution of manufactured goods, with especial attention given to the problems involved in relations of manufacturers, middlemen, and consumers; the organization of the sales department; sales management and the art of selling; typical advertising campaigns of different classes of producers; costing and its spread to the different elements of production, are subjects studied in this course. Instruction is given by lectures, laboratory work, and study of the text.

222. COST ACCOUNTING. Elective, both semesters. Class work, two hours. Two semester credits. Instructor ———.

Following a review of the principles of accounting, a general survey of the more important principles of cost accounting is made. This course is concerned particularly with the subject of production costs. The student is expected to keep the principles of costing in mind throughout the whole course, to the end that he may be able to adapt these working principles to concrete problems. Attention is given to the calculation and the distribution of overhead costs, and to the organization of cost systems. Practical problems are given for solution and as means of illustrating and applying the principles. Lectures, laboratory work, and study of the text are the methods of instruction.

225. CURRENT ECONOMIC PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Economics. Professor Kammeyer.

This course is intended to supplement Economics, course 201, and to give an opportunity to those who elect it to make a more intensive study of selected economic problems than was possible in that course. The subject matter varies, of course, to harmonize with changing economic conditions. At present the problems of economic insecurity, of population, of railway regulation or ownership, of international trade, of trade unionism and of taxation are of dominant interest and importance. These, or as many of them as time permits, are made the subject of careful study, classroom discussion and written reports. Materials are gathered from reference books, government publications, magazines and newspapers, and especial effort is made to encourage the student to think independently and to formulate his own judgments.

COURSES IN SOCIOLOGY

FOR GRADUATES AND UNDERGRADUATES

251. SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course deals with social life in general, involving a study of social origins, activities, and organization. Such social institutions as the family, the state, the church and the school are studied as to origin, development, organization and aims. The processes of socialization, social forces, and social control, particularly as they manifest themselves in rural life, receive special emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student to get his social bearings and to find himself as a fact and a factor in the complex interrelations of human society. Assigned library readings and special written reports are required. Instruction is by recitation, class discussion and lectures. Text: Hayes' *Introduction to Sociology*.

254. RURAL SOCIOLOGY. Elective, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course deals with the problem of the rural family, the rural school, the rural church, rural societies and associations, the economic and social activities of the community, and the relation of the state to the general welfare. Reasons for the increased interest in rural sociology and problems; the effect of environment and occupation on community life; advantages and disadvantages of rural life; marketing and transportation as factors of community development; the various social institutions of the community, boys' and girls' clubs, men's clubs, the grange and their possible economic and social activities; the country-life movement, and the reorganization of rural and social forces are then taken up. The interdependence of town, city and rural life are studied, with special emphasis on conditions as they exist in this State. Instruction is by assigned readings, lectures, and recitations. Text: Voght's *An Introduction to Rural Sociology*.

257. SOCIAL PROBLEMS. Elective, both semesters. Class work, two hours. Two semester credits. Instructor ———.

A study of social conditions and social legislation, with constructive methods of dealing with present social conditions. Stress is given in the early part of the course to the practical handling of statistical material for the purpose of acquainting students with the most important work done in the field of social inquiry. A study is made of unemployment, old age, invalidity pensions and sickness insurance, workmen's compensation, minimum-wage laws, mothers' pensions, assistance to school children, charity organizations, and employment bureaus. State-aided schemes of social reform and publicity as a means of social reform and control are discussed. Instruction is given by lectures, text, and library work.

260. COMMUNITY PROBLEMS. Elective, both semesters. Class work, one hour. One semester credit. Instructor ———.

A study is made of the larger problems of urban and rural community life, considered from the sociological standpoint. Agencies and movements for organization, development and improvement; surveys; community centers; schools and churches; granges; agencies of public health, safety, recreation, and charity—all these are investigated. Attention is given to the methods for studying a community so that it may find and organize itself for improvement. Field work, lectures, and library work are the methods of instruction. Arrangements may be made for extended credit by doing more extended field work than is required by the course.

Education

Professor HOLTON*
Associate Professor KENT
Associate Professor ANDREWS
Assistant Professor PETERSON
Assistant Professor ZAHNLEY
Assistant Professor LLOYD-JONES

The courses in this Department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter of the curriculum. All courses are based upon the proposition that education supported by public taxation should function in social and vocational efficiency.

The minimum requirements for the three-year State certificate re-

* On leave, 1918-'19.

newable for life are eighteen semester hours of work in this Department. Of these eighteen semester hours, nine are specified by the State Board of Education; namely, Psychology, Educational Administration, and Educational Psychology or Educational Sociology. For the remaining nine semester hours the teachers' elective group in the Division of Home Economics specifies Home Economics Education and Special Methods in the Teaching of Home Economics, along with Supervised Observation and Teaching in Home Economics. For the last named course three semester credits are allowed toward graduation, but no credit is granted toward the State certificate; however, if the student is taking a course in Supervised Observation and Teaching in order to qualify as a teacher of vocational home economics or vocational agriculture, as required by the Federal Board for Vocational Education, an elective credit of not to exceed three semester hours in professional subjects is accepted toward the State certificate. The remaining semester hours may be chosen out of the elective courses in the department.

Those who plan to qualify as teachers of vocational home economics should take the course approved by the State and Federal Boards for Vocational Education. See Division of Home Economics, page 187.

Prospective teachers of agriculture should take the course outlined under Division of Agriculture, page 90. Certain substitutions may be made in the course there outlined, when conditions justify. However, no variations from the required work in education is permitted. These prospective teachers of agriculture are held for the nine hours in education specified by the State Board of Education, *i. e.*, three hours each of Psychology, Educational Administration, and Educational Psychology or Educational Sociology. In addition to this work the State and Federal Boards for Vocational Education require Agricultural Education, Special Methods in the Teaching of Agriculture, and Practice Teaching in Agriculture. Practice Teaching in Agriculture is accepted in partial satisfaction of the required professional work for the State certificate for those taking the work to qualify as teachers of vocational agriculture only.

Prospective teachers of industrial arts subjects should elect Industrial Education, and Special Methods in the Teaching of Industrial Arts.

Persons who wish to secure the three-year certificate, renewable for three years, at the end of their sophomore year in College are required to take nine hours of work in the Department of Education, as follows: Psychology, Educational Administration, and General Methods. This certificate is granted by the State Board of Education to persons who have sixty semester hours of College credit, including the nine hours in education mentioned above. Holders of the certificates are eligible to teach in elementary schools, in junior high schools, and in high schools maintaining only a two-year course.

Required for all State life certificates: Psychology, three semester hours; Educational Administration, three semester hours; and Educational Psychology or Educational Sociology, three semester hours.

Additional requirements for approval for teaching Vocational Home Economics: Home Economics Education, two semester hours; Special Methods in the Teaching of Home Economics, three semester hours;

Practice Teaching, three semester hours; and Practice in Household Management, three semester hours.

Additional requirements for approval for teaching Vocational Agriculture: Agricultural Education, two semester hours; Special Methods in Teaching Agriculture, three semester hours; and Practice Teaching of Agriculture, three semester hours.

Required for the three-year teachers' certificate, renewable for three years: Psychology, three semester hours; Educational Administration, three semester hours; and General Methods, three semester hours.

The regulations of the State Board of Education allow the acceptance of only one course in special methods for the State certificate. This course must be taken in the student's senior year, in the field of his major work, and must be approved by the Department of Education.

COURSES IN EDUCATION

FOR UNDERGRADUATES

101. **PSYCHOLOGY.** Junior year and elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificates. Assistant Professor Peterson.

This course is a general introduction to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. It combines the study of selected texts and outside readings with lectures and class experiments.

102. **INTRODUCTION TO EDUCATION.** Elective, first or second semester. Class work, three hours. Three semester credits. Associate Professor Andrews.

Students beginning the study of education are given a general introduction to the problems and movements in modern education in this course. Modern methods of school support and control, of class and curriculum organization, of standardization, classroom management, play and health supervision, and other problems are discussed.

105. **EDUCATIONAL ADMINISTRATION.** Elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificates. Associate Professor Andrews.

This course is a study of the organization of state, city and county school systems, with special emphasis upon rural and vocational schools; the interrelation of the functions of boards of education, superintendents, principals, teachers. Study of the school law of Kansas is an important part of the course.

109. **EDUCATIONAL PSYCHOLOGY.** Elective, first or second semester. Class work, three hours. Three semester credits. Required for State teachers' certificates. Prerequisite: Psychology. Assistant Professor Peterson.

The course deals with those aspects of psychology that have a direct bearing upon educational practices. Attention is paid to the results of experimental investigations in the field. Instruction is by lectures and library work.

113. **HISTORY OF EDUCATION.** Elective, first or second semester. Class work, three hours. Three semester credits. Associate Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

118. EDUCATIONAL SOCIOLOGY. Elective, first or second semester. Class work, three hours. Three semester credits. Professor Holton.

This course deals with the concrete objectives of education considered as a process of social adjustment; the meaning of education in a democracy; the educative functions of the home, the community, the church and the school; the school as a special environment; the meaning of labor and leisure; cultural and vocational education; intellectual and practical studies; and physical and social studies.

121. HOME ECONOMICS EDUCATION. Elective, first or second semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach home economics. Prerequisite: Foods I and II, Clothing I and II, and Educational Administration. Assistant Professor Lloyd-Jones.

This course considers problems dealing with the place of home economics in modern secondary education; the aims and the organization of the work in various types of schools; the administration, maintenance, equipment and supervision of departments of home economics. Special attention is paid to Kansas conditions.

125. AGRICULTURAL EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Required of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Administration. Associate Professor Kent or Assistant Professor Zahnley.

A comparative study is made of the provisions for agricultural education in Kansas and other states and countries and of the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Elective, first semester. Class work, two hours. Two semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach manual training, shop work, trade courses, and other industrial subjects. Prerequisite: Educational Administration. Associate Professor Kent.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany and other foreign systems; of the making of a course of study in industrial education for secondary schools; and of shop equipment and costs.

132. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Elective, first or second semester. Class work, three hours. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to take home economics. Prerequisite: Foods I and II, Clothing I and II, and Psychology. Assistant Professor Lloyd-Jones.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany course 141.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Elective, second semester. Class work, three hours. Three semester credits. Required of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Associate Professor Kent or Assistant Professor Zahnley.

Training in planning lessons, organizing materials and conducting class and laboratory work in agriculture is the purposes of this course.

The work includes observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to the selection of laboratory materials, the supervision of laboratory exercises, and the adaptation of class and laboratory work to each other.

140. SPECIAL METHODS IN THE TEACHING OF INDUSTRIAL ARTS SUBJECTS. Elective, second semester. Class work, three hours. Three semester credits. Expected of all candidates for the State teachers' certificates who are preparing to teach industrial subjects. Prerequisites: Mechanical Drawing II, Woodworking II, and Educational Psychology. Associate Professor Kent.

The various lines of work included under the head of industrial arts are studied and a series of progressive lessons worked out in each of these lines emphasizing important elements. A study is made of the various materials employed and the methods of utilizing them for the needs of pupils. The arrangement of courses, the outlines and presentation of assignments, the preparation of assignments, the preparation of laboratory material and the conduct of laboratory exercises are taken up. The work includes recitations, class discussions, assigned readings and written reports.

Physics 224. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective. Class work, two hours; laboratory, three hours. Three semester credits. Assistant Professor Raburn.

(See Department of Physics, course 224.)

Math. 122. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective. Class work, three hours. Three semester credits. Assistant Professor Stratton.

(See Department of Mathematics, course 122.)

141. SUPERVISED OBSERVATION AND TEACHING IN HOME ECONOMICS. Elective, first or second semester. Three semester credits. Prerequisites: Foods I and II, Clothing I and II, and Special Methods in the Teaching of Home Economics. Assistant Professor Lloyd-Jones.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the classes of the junior high school of Manhattan.

146. SUPERVISED OBSERVATION AND TEACHING IN AGRICULTURE. Elective, first or second semester. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach agriculture. Prerequisite: Educational Psychology. Associate Professor Kent or Assistant Professor Zahnley.

Students expecting to teach take this work as a part of the regular class in the School of Agriculture. The work is supervised by a member of the Department of Education and by the regular class teacher. Both teachers criticize lesson plans and presentation.

150. SUPERVISED OBSERVATION AND TEACHING IN INDUSTRIAL ARTS. Elective, first or second semester. Three semester credits. Expected of all candidates for State teachers' certificates who are preparing to teach industrial arts. Prerequisite: Educational Psychology. Associate Professor Kent.

Industrial classes conducted by experienced teachers are visited and careful observations are made in regard to sequence of courses, methods of presentation, interest, class order, and other phases of class work. Reports are presented on this work for discussion. Students are assigned teaching work under careful supervision, results are noted and suggestions are made for individual improvement.

FOR GRADUATES AND UNDERGRADUATES

201. RURAL EDUCATION. Elective, first or second semester. Class work, three hours. Three semester credits. Prerequisite: Educational Administration. Professor Holton.

This course deals with extension education, boys' and girls' club work, the problems of the rural school, consolidation, social centers, farmers' organizations, and all forms of organized community life in the open country. A certain amount of field work is done in connection with the course.

211. EDUCATIONAL MEASUREMENTS. Senior year, both semesters. Class work, two hours. Two semester credits. Prerequisite: Educational Psychology. Assistant Professor Peterson.

The course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

215. APPLIED PSYCHOLOGY. Senior year or graduate work, second semester. Class work, two hours. Two semester credits. Prerequisite: Psychology. Assistant Professor Peterson.

A study is made of the psychological conditions of personal, industrial and business efficiency as determined by observation and experiment in such special fields as advertising, salesmanship, employment, scientific management, etc. Special attention is given to the use of psychological tests in employment, vocational guidance, etc.

FOR GRADUATES

301 and 302. EDUCATION SEMINAR I and II. Open to candidates for the master's degree. First and second semester, respectively. Class work, two hours. Four semester credits on completion of both courses; no credit for either separately. Prerequisites: Educational Psychology, and Educational Administration. Professor Holton.

The work consists of lectures, reports, and class discussions. Each member of the seminar chooses a topic early in the term for special investigation. Preliminary reports are made to the class from time to time and the final results of the study are embodied in a paper.

English

Professor SEARSON*
 Professor MACARTHUR
 Professor DAVIS
 Associate Professor CONOVER
 Assistant Professor RICE
 Assistant Professor MACLEAN

Instructor LEONARD
 Instructor SYFORD*
 Instructor RUSSEL
 Instructor HAZLETT
 Instructor HEIZER
 Instructor BURK

Ability to think well and to speak well, and capacity to appreciate the world's best literature, are recognized essentials of a liberal education. The work of the Department of English is to acquaint the student with the best standards of English practice and appreciation, and to encourage him to maintain these standards in all his work. To this end the Department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching

* Absent on leave, 1918-'19.

the vital interests of the student. The study of the English language and literature is thus made the means of increasing the power and efficiency of the individual. It is therefore the aim of the Department, in coöperation with the technical departments of the College, to increase the knowledge and effectiveness of the students.

COURSES IN ENGLISH LANGUAGE

FOR UNDERGRADUATES

101. COLLEGE RHETORIC I. Freshman year, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: Three units of high-school English. Professor Searson, Professor Macarthur, Professor Davis, Associate Professor Conover, Assistant Professors Rice and Maclean, Miss Leonard, Miss Russel, Mr. Hazlett, Miss Heizer, and Mrs. Burk.

After a series of tests to determine the fitness of the student to pursue the work of the course, a rapid, thorough review of the essentials of English is given, special attention being paid to sentence and to paragraph structure. This is followed by themes designed to develop the student's ability to tell accurately what he knows, to describe interestingly what he sees, and, above all, to enable him to relate the subject of English to the work which he expects to do in after life. Texts: Greever and Jones, *Century Handbook of Writing*; Cunliffe and Lomer, *Writing of To-day*, first half.

104. COLLEGE RHETORIC II. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Searson, Professor Macarthur, Professor Davis, Associate Professor Conover, Assistant Professors Rice and Maclean, Miss Leonard, Miss Russel, Mr. Hazlett, Miss Heizer, and Mrs. Burk.

This course is a continuation of the work in College Rhetoric I. Special emphasis is laid on outlining and on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course. Texts: Canby and others, *English Composition in Theory and Practice*; Cunliffe and Lomer, *Writing of To-day*, second half.

107. SPECIAL ENGLISH. Freshman year, both semesters. Class work, three hours. No credit. Professor Davis and Assistant Professor Maclean.

This course is a review of the essentials of English composition, accompanied by drills in sentence structure and in idiomatic expression, by special exercises and by consultations. It is required of any student assigned to College Rhetoric I who within the first few weeks of the work of that course shows that he is unable to express his ideas clearly and accurately. Textbook: Greever and Jones, *Century Handbook of Writing*.

110. ENGINEERING ENGLISH. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Macarthur.

This is an advanced course in English particularly adapted to the needs of engineers. The general problems of engineering writing are discussed. Specific assignments are made in the writing of business letters relating to engineering, and in the preparation of technical manuscripts and reports. Essays of especial value to the engineer are read and analyzed. Texts: Watt, *The Composition of Technical Papers*; Aydelotte, *English and Engineering*.

113. ADVANCED COMPOSITION I. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Associate Professor Conover.

In this course special emphasis is given to the subject of exposition. The subjects of the themes required are taken as far as possible from the student's particular field of work. Models of reports, explanations and general expository work are carefully studied. Text: Jelliffe, *Handbook of Exposition*.

116. ADVANCED COMPOSITION II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Advanced Composition I. Associate Professor Conover.

Narrative writing is studied in this course, both in its relation to the other forms of composition and as an independent form. The practical forms of narrative are studied in detail, and attention is given to the short story. Text: Buck and Morris, *Narrative Writing*.

119. ARGUMENTATION AND DEBATE. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Assistant Professor Maclean.

This course includes a systematic study of the theory of debate; brief making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material; and effective methods of refuting arguments. Consultations, library investigations and special group conferences form helpful laboratory features of the course. Text: Stone and Garrison, *Essentials of Argument*.

122. BUSINESS ENGLISH. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course comprises a thorough review of business forms and general business writing, with special attention to business correspondence and special sales letters. A close study is made of the principles of effective writing as they are found applied in the best writing in the commercial world. Text: Gardner, *Effective Business Letters*.

125. ADVERTISING ENGLISH. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

This course offers a study of the principles of effective English as they are applied in present-day advertising writing. A preliminary survey of the principles of advertising is made in the early part of the course. Later actual practice is given in the writing and printing of the fundamental types of advertisements. Text: Hall, *Writing an Advertisement*.

128. ORAL ENGLISH I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur and Miss Heizer.

In this course a study of the principles of oral composition and practice in oral composition in the form of explanations, narrations, descriptions, selling and other business talks, travel talks and speeches for special occasions are offered. For materials for the exercises given in class, students are directed to cultural subjects, more particularly to painting, sculpture, architecture, and music. Text: Brewer, *Oral Composition*.

131. ORAL ENGLISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric I. Professor Macarthur and Miss Heizer.

This course is a continuation of Oral English I, but does not require it as a prerequisite. Attention is directed especially to the forms of oral English more commonly employed, such as conversation, the toast or

after-dinner speech, introductions, nominations, announcements, presentations, and the like. For reading the students are directed to current magazines so as to be able to discuss current events of all kinds. Text: Brewer, *Oral Composition*.

134. METHODS OF TEACHING ENGLISH. Elective, second semester and summer school. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professors Searson and Davis.

This course is planned to meet the needs of those who are called upon to teach English in connection with the applied sciences. The course of study, the application of English instruction to life needs and definite methods of motivating English instruction are specially considered. Text: Carpenter, Baker, and Scott, *The Teaching of English*.

137. AGRICULTURAL ENGLISH. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

This course consists of a rapid review of the essentials of English composition as applied in the business writing of the modern farmer. Business correspondence, bulletin writing, the organization of short business talks, and the basic principles of farm advertising are considered. The problems of writing that confront the county agent, the high-school teacher of agriculture and the farm manager are made the subject of discussion and practice.

151. COMPOSITION AND LITERATURE I. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Three units of high-school English. Professor Davis, Associate Professor Conover, Miss Leonard, and Mr. Hazlett.

This course consists of a presentation of literary principles with a view to teaching the student how to study and appreciate the best in literature. Masterpieces of drama, of narrative and of lyric poetry are studied intensively in class, and frequent compositions upon the selections studied are required. Textbook: Heydrick, *How to Study Literature*; selected texts in dramatic, narrative and lyric poetry; Greever and Jones, *Century Handbook of Writing*.

154. COMPOSITION AND LITERATURE II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Composition and Literature I. Associate Professor Conover, Assistant Professor Rice, Miss Leonard, and Miss Russel.

This course is a continuation of Composition and Literature I. In it masterpieces of fiction, the essay and the oration are intensively studied. The composition work is continued. Textbook: Heydrick, *How to Study Literature*; selected texts in fiction, the essay, and the oration; Greever and Jones, *Century Handbook of Writing*.

FOR GRADUATES AND UNDERGRADUATES

201. FARM ADVERTISING. Elective, first semester. Class work and practice, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads," "story ads," and handbills, and how to feature the central point in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary. Text: Starch, *Advertising*.

204. FARM BULLETINS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: College Rhetoric II. Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins are made the basis for the work. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write farm bulletins.

207. TECHNICAL WRITING. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: One of the following courses: 113, 116, 122, 125, 201, 204. Professors Searson and Macarthur.

This course is planned to help students properly to record and to report technical work. Fundamental principles of technical writing are studied in connection with such practice as will necessitate clearness, accuracy, and effectiveness. Text: Watt, *The Composition of Technical Papers*.

210. HOME ECONOMICS ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Assistant Professor Maclean.

This course recognizes the special needs of women in home, club and social life, and provides a special training to meet those needs. Note taking, outlining and abstracting in home economics; club papers, special reports, book reviews, demonstration talks, social correspondence, and human-interest stories from home environment are considered in this course. Text: Moore, Tompkins and Maclean, *English Composition for College Women*.

251. THE SHORT STORY. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I or Composition and Literature II. Assistant Professor Rice.

Practice in writing short stories, based upon a thorough study of the world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action, and character analysis—are especially emphasized. Text: Esenwein, *Writing the Short Story*; Ashmun, *Modern Short Stories*.

254. COMMUNITY ENGLISH. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I or Composition and Literature II. Professor Searson.

This course comprises the study and practice of the English work most needed in the activities and recreations of community life. A detailed study is made of the pageant. The class is organized as a special group and its members are trained in the various forms of procedure that may be required in the rural community. Text: Bates and Orr, *Pageants and Pageantry*.

FOR GRADUATES

301. HISTORY OF LANGUAGE. Elective, first semester. Class conference, two hours. Two semester credits. Prerequisite: English Literature II. Professors Searson and Macarthur.

This course offers a study of the origin and development of the English language. Text: Wyld's *Historical Study of the Mother Tongue*.

304. SPECIAL STUDIES. Elective, second semester. Class conference, two hours. Two semester credits. Prerequisite: History of Language. Professor Searson and Assistant Professor Conover.

Individual assignments are made in the fundamental fields of research in applied English. The student is required to carry on an original investigation and to make an acceptable report of his research work.

COURSES IN ENGLISH LITERATURE

FOR UNDERGRADUATES

171. ENGLISH LITERATURE I. Sophomore year, both semesters and summer school. Class work, four hours. Four semester credits. Prerequisite: College Rhetoric II. Professor Searson, Professor Davis, Associate Professor Conover, Assistant Professors Rice and Maclean, Miss Leonard, Miss Russel and Miss Heizer.

In this course the students are made familiar with the principles of literary appreciation and are taught to apply them to selected texts in narrative, lyric and dramatic poetry, as well as in fiction, the essay, and the oration. The work of the course is intensive, notebooks are kept, and frequent tests are given. Text: Heydrick, *How to Study Literature*.

174. ENGLISH LITERATURE II. Sophomore year, both semesters. Class work, four hours. Four semester credits. Prerequisite: English Literature I or Composition and Literature II. Professor Macarthur, Professor Davis, Associate Professor Conover, Assistant Professors Rice and Maclean, Miss Russel, Mr. Hazlett, and Miss Heizer.

This course presents history of English literature by means of lectures and of discussions of the text. Extensive assignment in reading are made, and reports are given in class. Weekly tests are required. Text: Long, *English Literature*.

177. ENGLISH LITERATURE HE-I. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: College Rhetoric II. Professor Davis, Assistant Professors Rice and Maclean, Miss Russel, and Miss Heizer.

This course offers in slightly condensed form the work given in course 171. Text: Heydrick, *How to Study Literature*.

180. ENGLISH LITERATURE HE-II. Sophomore year, both semesters. Class work, three hours. Three semester credits. Prerequisite: English Literature HE-I. Professor Davis, Associate Professor Conover, Assistant Professors Rice and Maclean, Miss Russel, and Miss Heizer.

This course presents a history of English literature in much the same way as course 174. The amount of reading required is slightly less. Text: Long, *English Literature*.

FOR GRADUATES AND UNDERGRADUATES

271. THE ENGLISH BIBLE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I, or Composition and Literature II. Professor Searson.

This course familiarizes the student with the different kinds of literature found in the English Bible. A careful study is also made of the style of that great classic in order to discover the secrets of its simplicity, clearness, and power. Text: Moulton, *Short Introduction to the Literature of the Bible*.

274. THE SHAKSPEREAN DRAMA. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I, or Composition and Literature II. Professor Searson and Professor Macarthur.

This course includes a study of Shakspeare's life and times and the reading of ten of his greatest plays. Text: Boas, *Shakspeare and His Predecessors*.

277. NINETEENTH CENTURY LITERATURE. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature II. Professor Macarthur and Associate Professor Conover.

In this course there is discussion of the literary movements found

throughout the century, especially in the Victorian period. Significant works are read and are made the subjects of class reports and discussions. Text: Saintsbury, *Nineteenth Century Literature*.

280. AMERICAN LITERATURE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I, or Composition and Literature II. Professor Davis and Miss Leonard.

The course consists of lectures on the history of American literature and of class reports on assigned readings. A special study is made of the standard works of the chief American authors. Text: Curtis Hidden Page, *Chief American Poets*.

282. CURRENT LITERATURE. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: English Literature I, or Composition and Literature II. Associate Professor Conover.

It is the aim of this course to establish a definite basis or standard of literary criticism and appreciation by an inductive study of contemporary literature. The course includes a consideration of the best works of such literary figures as Tagore, Henry James, Maeterlinck, Galsworthy, Anatole France, Thomas Hardy, Tchekov, Bernard Shaw, Selma Lagerlöf, Emile Verhaeren, Arnold Bennett, Stephen Phillips, Wm. Butler Yeats, J. M. Synge, Alfred Noyes, and the younger group.

285. THE NOVEL. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Literature II. Associate Professor Conover.

A study of the English novel, including the discussion of its historical development, its relation to other forms of fiction, and its place in contemporary literature. Especial attention is given to representative works of modern writers, both English and American. Text: Cross, *The Development of the English Novel*.

288. ENGLISH SURVEY I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Searson, Professor Macarthur.

This course offers an advanced study in the history of English literature. Beginning with Anglo-Saxon times the course continues through the Middle English period down to the close of the Elizabethan period. Text: Garnett and Goss, *History of English Literature*, Vols. I and II.

290. ENGLISH SURVEY II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: English Survey I. Professors Searson and Macarthur.

This course is a continuation of English Survey I. It traces the rise of Puritanism and its influences on English literature. Emphasis is placed upon the classical movement. A brief survey is made of romanticism and its development. Text: Garnett and Goss, *History of English Literature*, Vols. III and IV.

293. TENNYSON AND BROWNING. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: English Literature I, or Composition and Literature II. Professor Searson.

This course offers a study in the interpretation of some of the best known poems of Browning and Tennyson. Texts: Phelps, *Browning, How to Know Him*; Van Dyke, *The Poetry of Tennyson*.

295. THE ARTS AND CRAFTS MOVEMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature, or its equivalent. Professor Macarthur.

This course takes as its basis the life of Wm. Morris, and treats of the arts and crafts movement in its relation to literature. Works of Morris, Rossetti, Ruskin, and other writers of the same group are read and discussed. Text: Mackail's *Life of William Morris*.

FOR GRADUATES

310. THE ROMANTIC MOVEMENT I. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson and Associate Professor Conover.

This course offers advanced work in the study of eighteenth century romanticism. Text: Beers, *A History of English Romanticism in the Eighteenth Century*.

313. THE ROMANTIC MOVEMENT II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Nineteenth Century Literature. Professor Searson and Associate Professor Conover.

This course continues throughout the Victorian period the work done in the preceding course. Text: Beers, *A History of English Romanticism in the Nineteenth Century*.

Entomology

Professor DEAN
Associate Professor TANQUARY
Assistant Professor MERRILL

Associate Entomologist MCCOLLOCH
Assistant HAYES

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as of the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored) and a series of microscope slides are available for illustration. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedded ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air-conditioning machine in the insectary adds materially to the possibilities for experimental work. A field station with all the necessary equipment provides means for the study of insects under normal field conditions.

COURSES IN ENTOMOLOGY

FOR UNDERGRADUATES

101. GENERAL ENTOMOLOGY. Junior year and elective, both semesters and summer school. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: General Zoölogy I and II. Professor Dean, Associate Professor Tanquary.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

106. HOUSEHOLD ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisites: General Zoölogy I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects, complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

111. APICULTURE. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Zoölogy I and II. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities, and products of the honeybee. Special attention is given to practical beekeeping, the best methods used among beekeepers being discussed. A study is made of bee diseases and of the standard methods to be used in their eradication and control. A study is also made of the relation of bees to agriculture and horticulture.

116. MILLING ENTOMOLOGY. Junior year, second semester. Class work one hour. One semester credit. Professor Dean.

This is a study of the insect pests of flour mills, elevators, granaries, warehouses, and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips are made to flour mills and warehouses.

FOR GRADUATES AND UNDERGRADUATES

201. HORTICULTURAL ENTOMOLOGY. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: General Entomology. Assistant Professor Merrill.

This is a study of the most important insect pests of orchard, garden and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

206. GENERAL ECONOMIC ENTOMOLOGY. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Professor Dean.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in

the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

211. INSECT MORPHOLOGY I. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisite: General Entomology. Associate Professor Tanquary.

This course deals exclusively with the external anatomy of representative insects belonging to a number of orders. The types studied are selected so as to present the essentials of the structure of the exoskeleton and to afford a basis for the courses in taxonomy and for professional studies in hexapod morphology.

216. PRINCIPLES OF TAXONOMY. Elective, second semester. Lectures, one hour. One semester credit. Prerequisite: (1) For students taking Taxonomy of Insects I: General Entomology, and Insect Morphology I. (2) For students taking Taxonomy of Vertebrates: General Zoölogy I and II. All students registering in either of the above-mentioned courses must also register for this course. Courses cannot be taken separately. Associate Professor Tanquary.

This course of lectures deals with the fundamental principles of modern taxonomy. The following subjects are considered in detail: Systems of classification; terminology of taxonomic groups; criteria of species and genera; binomial nomenclature; pre-Linnæan and modern nomenclature; international code of zoölogical nomenclature, and other codes; law of priority; and modern tendencies in taxonomy.

217. TAXONOMY OF INSECTS I. Elective, second semester. Laboratory, six hours. Two semester credits. Prerequisites: General Entomology, and Insect Morphology I. Students registering for this course must also register for the course in Principles of Taxonomy. Associate Professor Tanquary.

This is a study of the general principles of the classification of representative insects. The purpose of the course is so to familiarize the student with the literature, methods and ideals of classification that he will be able to identify unknown forms and to pursue advanced taxonomic studies.

221. ADVANCED GENERAL ENTOMOLOGY. Elective, first semester. Class work, three hours. Three semester credits. The class work consists of lectures, assigned readings, and written reports. Prerequisite: General Entomology. Associate Professor Tanquary.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology are correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course includes, in part, a detailed consideration of the following: Phylogeny of insects and their relatives; metamerism; reproduction; gynandromorphism; parthenogenesis; pædogenesis; polyembryony; respiration; temperature; embryology; internal and external metamorphosis; metabolism; aquatic insects, their evolution, adaptations, and activities; regeneration; experimental work with insects; insect parasitism; color and coloration; insects in relation to other organisms; insect behavior; and geological and geographical distribution.

226. MEDICAL ENTOMOLOGY. Elective, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisite: General Entomology. Associate Professor Tanquary.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

Laboratory.—The laboratory work consists of a careful study of insects and other arthropods which may affect the health of man directly, and of those which may be instrumental in the dissemination of disease; also a study of the causative organisms of certain insect-borne diseases and the methods by which these organisms are transmitted.

231. ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, first semester. Lectures, one hour. One semester credit. Prerequisite: General Entomology. Associate Professor Tanquary.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the needs of advanced undergraduates and graduate students who are beginning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to take this course.

236. ZOÖLOGICAL AND ENTOMOLOGICAL SEMINAR. Elective, both semesters. One two-hour session each week. One semester credit. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussion of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

301. INSECT MORPHOLOGY II. Elective, first semester. Laboratory, nine hours. Three semester credits. Prerequisite: Insect Morphology I. Associate Professor Tanquary.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

306. TAXONOMY OF INSECTS II. Elective, second semester. Laboratory, nine hours. Three semester credits. Prerequisite: Taxonomy I and Insect Morphology II. Associate Professor Tanquary.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected groups.

311. INSECT HISTOLOGY. Elective, first semester. Class work, one hour; laboratory, six hours. Three semester credits. Prerequisites: General Entomology, and General Cytology. Associate Professor Tanquary.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects. Practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining and mounting the various groups of insects and insect tissues afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

316. RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: taxonomy, morphology, economic entomology. Such work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experiment Station during the summer vacation and receive training in the investigation of economic problems. Prerequisites: (1) For research in taxonomy and morphology: General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. (2) For research in economic entomology: General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I. Professor Dean, Assistant Professor Merrill, Associate Professor Tanquary, and Associate Entomologist McColloch.

Geology

Professor NABOURS
Associate Professor NEWMAN

By use of abundant illustrative material, an effort is made to have the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. The agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, limestone, glacial drift and sand dunes, are available for illustrative purposes.

COURSES IN GEOLOGY

FOR UNDERGRADUATES

101. DYNAMIC AND STRUCTURAL GEOLOGY. Elective, first semester. Class work, two hours; two field trips during the semester. Two semester credits. Professor Nabours.

This course consists of a brief study of the structure of the earth, and of the agencies by which rocks are formed or destroyed and the topographic features of the earth produced. Text: *Introductory Geology*, by Chamberlain and Salisbury.

102. ENGINEERING GEOLOGY. Junior year and elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Professor Nabours and Associate Professor Newman.

The class work consists of a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks and references.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks and their mineral constituents.

FOR GRADUATES AND UNDERGRADUATES

201. HISTORICAL GEOLOGY. Elective, second semester. Class work, two hours; two field trips during the semester. Two semester credits. Prerequisites: Geology 101, Elementary Zoölogy, and General Botany, or equivalent. Professor Nabours.

This course takes up a brief study of the history of the earth as shown by the record in the rocks. Special emphasis is placed on the history of life as indicated by the fossils.

History and Civics

Professor PRICE
Associate Professor TAYLOR*
Associate Professor ILES

Assistant Professor JAMES
Assistant Professor PEINE †
Instructor OREM

Training for citizenship, breadth of view, historic-mindedness, fairness of judgement and general culture are constant and specific aims of each course offered by the Department of History and Civics. As a result of the training received in these courses the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast. In our modern age and self-governing nation, and in an institution supported by the State and Nation, it would seem to be the imperative duty of every student to secure specific training for wise and effective leadership in the governmental affairs of the State and Nation that are thus preparing him for life and its duties.

COURSES IN HISTORY

FOR UNDERGRADUATES

101. AMERICAN HISTORY I (*or* BEGINNINGS OF THE AMERICAN NATION). Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations, based on *An American History Note Book*, prepared by the Department.

* Died October 14, 1918.

† Beginning September 1, 1919.

105. AMERICAN INDUSTRIAL HISTORY. Sophomore and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Assistant Professor James.

This course traces the history of American agriculture, manufactures, and commerce with related activities from their colonial beginnings to the present. It includes a survey of the physical basis for American history, the growth of population and its expansion across the continent, and the reflection of these things on our industrial, social and political life. European developments, especially the industrial revolution and the expansion of commerce, are studied for the light they throw on American history. Finally, throughout the course an attempt is made to trace the growth of our national industrial organization and its present-day aspects. This course is based on *Outlines of American Industrial History*, prepared by the Department. A text, such as Coman's *Industrial History of the United States* or Bogart's *Economic History of the United States* is required, and the student is held responsible (a) for the contents of his text and (b) for assigned library work and lectures.

121. ENGLISH HISTORY. Sophomore year, both semesters and summer school. Class work, three hours. Three semester credits. Not open for credit to students who offer English history for entrance; such students should take History 226 or some other three-hour College course in history. Assistant Professor James.

This is a general survey of the whole field of English history with some emphasis on the modern period. It includes the outlines of political history and the essentials of English constitutional development. Special attention is given to the development of the empire, to the English background of American history, and to the industrial and social development of the English people. The work is based on Cheyney's *Short History of England*, with lectures and assigned readings.

123. HISTORY OF WESTERN EUROPE. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor ———.

This is a general course in the history of Europe from the fall of Rome to the end of the Napoleonic era. It includes a study of medieval institutions, the rise of towns and commerce, the development of western nations, the Renaissance and the Reformation, the commercial and industrial revolution, and the expansion of Europe, and closes with a survey of France in the eighteenth century, the French Revolution, and the age of Napoleon. The work is based on a standard text with lectures and assigned readings.

126. CURRENT HISTORY. Freshman year, both semesters and summer school. Class work, one hour. One credit each semester. Open as elective for not to exceed a total of four semester credits. Assistant Professor James.

The content of this course differs each semester from that of any other semester. The text for the course is a good weekly magazine, such as *The Independent* or *The Outlook*; but this is supplemented by such monthly periodicals as *The Review of Reviews* and *World's Work*, together with the daily papers and some library references. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Elective, summer school. Class work, two hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussion based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on methods in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. The course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civics courses.

FOR GRADUATES AND UNDERGRADUATES

202. AMERICAN HISTORY II (*or* WESTWARD EXPANSION AND SECTIONALISM). Elective, both semesters and summer school. Class work, three hours. Three semester credits. Professor Price.

This course concerns itself with the industrial conditions, the issues and the leaders of the middle period of our history, from the close of the War of 1812 to the Civil War. Among the subjects investigated are the industrial and political conditions in America in 1816; the Missouri Compromise; the antislavery agitation; the Webster-Hayne debate; South Carolina nullification; annexation of Louisiana, Florida, and especially Texas; the Mexican War, and the resulting preponderance of the slavery issue; the Compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; and the events leading immediately to the secession of the Southern States. Instruction is by means of lectures, recitations, and readings, based on *An American History Notebook*, prepared by the Department.

203. AMERICAN HISTORY III (*or* THE NEW INDUSTRIAL AGE). Elective, second semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course opens with a review of the industrial conditions in America just before the Civil War; next a careful examination is made of the industrial effects of that war; finally a study of the political and constitutional history of the last half-century is made in the light of the industrial conditions and developments of the same period. Manufactures, commerce, and especially agriculture, are carefully examined, particularly with reference to the South and West. The new developments in political parties and the new devices in self-government are carefully studied as to developments, cause, and present conditions. The new America, with its spirit of nationality, its emphatic self-government, and its new world power and responsibility, are studied especially in the light of the new industrial developments. Instruction is imparted by lectures, recitations, assigned readings, and special reports.

204. AMERICAN AGRICULTURAL HISTORY. Elective, first semester and summer school. Class work, three hours. Three semester credits. Professor Price.

This course is intended primarily for students in the Division of Agriculture. It devotes itself chiefly to the history of American agriculture. The course starts with a study of European background and Indian beginnings. It traces and compares the agricultural development of New

England, the South and the central colonies during the colonial period; then follows the westward movement into the prairie regions of the Mississippi valley, with the distinctive American developments in methods, livestock and especially farm machinery. The course gives special consideration to the South with its cotton, to the Northwest with its wheat, to the Southwest with its livestock, and to the corn belt with its varied industries. A special study is made of the last quarter-century, when varied industries, more intensive farming and the high cost of living are replacing extensive mining of the soil, with its remarkable era of low cost of living, its sudden accumulation of wealth, and its rapid development of civilization. The relation of all this to our own State is constantly kept in view. This course should be supplemented by the course in American Political History. Instruction is given by lectures and recitations, readings and reports.

206. AMERICAN POLITICAL HISTORY. Elective, first semester. Class work, two hours. Two semester credits. This course is especially intended to supplement course 204 or course 105; it is not open for credit to students who have credit in course 202. Associate Professor Iles.

This course gives the story of the origin, development, leaders and function of political parties in America, and studies the issues and results of the more important presidential elections. It traces the growth of nationality and the development of self-government through American history, but with special reference to present tendencies. This is a very desirable course for any one who would understand and appreciate present political and governmental conditions and tendencies.

207. PAN-AMERICA. Elective, first semester. Class work, two hours. Two semester credits. Assistant Professor James.

The history, government, and industrial conditions of Canada, Mexico, and the South American nations, and the interrelations of each of these and the United States are studied in this course.

223. MODERN EUROPE (SINCE 1814). Sophomore and junior years and elective, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course traces the evolution of the modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. Political problems and social and economic adjustments due to the Great War are included. Recitations, lectures, and assigned readings. Text: Hayes's *A Political and Social History of Modern Europe*, Vol. II., with special studies on the World War.

224. EUROPEAN INDUSTRIAL HISTORY. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor ———.

This course includes a survey of the industrial and social history of England and the European continent, with some reference to those regions which have been brought into touch with European industrial development. It begins with a view of conditions under the later Roman empire, followed by a study of the medieval manor, the rise of commerce and the towns, the growth of manufactures and the guilds, the development of the middle and laboring classes, the beginnings of modern industry and commerce, and the agricultural and industrial revolution. It closes with a somewhat detailed study of the social and industrial development of modern Europe to the most recent times. Special use is made of such texts as Cheyney's *Industrial and Social History of England*, Day's *History of Commerce*, and Ogg's *Economic Development of Modern Europe*, supplemented by lectures and assigned readings.

225. HISTORY OF THE HOME. Elective, second semester. Class work, three hours. Three semester credits. Miss Orem.

This course includes the history of the primitive family; the Hebrew family; the family life of the Greeks and of the Romans; and the history

of the home and family during the Middle Ages, including the influence of the Christian church. Next the history of the English family in the seventeenth and eighteenth centuries and of the American colonial home are studied. This is followed by a study of the industrial revolution and its effects upon family life. Finally, the history of the family during the nineteenth century, the present situation and tendencies are examined. The course is based primarily on Goodsell's *History of the Family*, supplemented by lectures and special studies.

226. MODERN ENGLAND AND THE BRITISH EMPIRE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Entrance credit in English history or three hours College credit in history, preferably History 121. Assistant Professor ———.

This course begins approximately with the accession of the Tudors in 1485. Special emphasis is placed on the beginnings and growth of world empire, England's part in international affairs, the economic and social history of the British Islands, and the changes by which England's government has become a practical democracy. The work closes with a survey of England and her empire as they exist today with their part in the World War. The course is based on Cross's *History of England and Greater Britain*, with lectures, assigned readings, and reports.

228. IMMIGRATION AND INTERNATIONAL RELATIONS. Elective, second semester. Class work, two hours. Two semester credits. Professor Price.

The title of the course suggests its content. It includes a study of the causes and the effects—economic, social, and political—of the coming of the foreigner to our shores, including the colonial period, the middle period, and the period since our Civil War, with special reference to the recent changes both as to character of the immigrants and the conditions in America. The text for this part of the course is Fairchild's *Immigration—A World Movement and Its American Significance*. The second part of the course is covered by lectures and assigned readings and reports. The text for the second part of the course is Latane's *From Isolation to Leadership*.

229. THE ANCIENT WORLD. Elective, first semester. Class work, three hours. Three semester credits. Miss Orem.

This course is intended primarily for those who expect to teach this subject in the high schools. It includes a study of the ancient world, with special reference to its industries, art, literature, and government. The standard modern texts are used, and the student is familiarized with the best modern literature on the subject.

230. KANSAS HISTORY. Elective, second semester. Class work, two hours. Two semester credits. Assistant Professor ———.

This course covers the history of Kansas from the beginning down to the present time, with emphasis on the period of statehood. The conquest of the frontier, the building of the State, and the social, industrial, and political advance to the present day are studied. This is a library course, based on outlines and references prepared by the Department.

232. HISTORY OF BRITISH AGRICULTURE. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor ———.

This is a somewhat detailed study of agricultural developments in the British Islands, with considerable attention to affairs in the neighboring countries on the continent and in the outlying portions of the empire. Particular attention is given to the economic and social aspects of rural and agricultural affairs in the British Islands in the modern period. The course is based on Prothero's *English Farming, Past and Present*, supplemented by lectures and assigned readings.

235c. SEMINAR IN AMERICAN INDUSTRIAL HISTORY. Course 235c gives special emphasis to the period since 1890.) Elective, both semesters. Class work, two hours. Two semester credits. Assistant Professor _____.

This course comprises a detailed study of a brief period of American economic history, including agriculture, manufacture and commerce. By lectures and assigned readings the class obtains a general view of the period chosen for study. Each student is assigned a special topic for independent research and reports. A brief training is given in the elements of the methods of historical research and presentation very necessary for graduate work in history. The seminar is open to graduate students and to advanced undergraduates who have had sufficient training and can convince the instructor in charge that they can pursue the work creditably. As the period studied varies from term to term it is possible for a student to register for more than one semester's credit.

COURSES IN CIVICS

FOR UNDERGRADUATES

151. AMERICAN GOVERNMENT. Junior and senior years, both semesters and summer school. Class work, three hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

153. BUSINESS LAW I. All years, both semesters. Class work, one hour. One semester credit. Assistant Professor James.

This course includes a careful study of the essential principles in the law of contracts, of sales, and of negotiable instruments. It should be followed by Business Law II. Text: Huffcut's *Elements of Business Law*.

154. BUSINESS LAW II. Elective, both semesters. Class work, one hour. One semester credit. Prerequisite: Business Law I. Assistant Professor James.

This course includes a careful study of the more fundamental principles of the law of agency, of insurance, of guarantee and damages; of partnership and corporations; of bailments, including common carriers; of torts, especially the law of negligence; and of patent rights. Text: Huffcut's *Elements of Business Law*, and the *Kansas Statutes*.

155. FARM LAW. Elective, both semesters. Class work, two hours. Two semester credits. Assistant Professor James.

This course outlines the following subjects as far as the time permits: *First*. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; livestock—liability of owner, trespassing animals, estrays. *Second*. Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Green's *Law for the American Farmer*, supplemented by the *Kansas Statutes*.

FOR GRADUATES AND UNDERGRADUATES

252. COMPARATIVE GOVERNMENT. Elective, first semester. Class work, two hours. Two semester credits. Associate Professor Iles.

This course comprises a study of the leading features, especially with regard to administration, of certain European governments such as England, France, and Germany, and a comparison of essential features with government in the United States. It is planned to supplement and round out the course in American Government. Text: Macy and Gannaway's *Comparative Free Government* or Holt's *Introduction to the Study of Government*.

256. INTERNATIONAL LAW. Elective, first semester. Class work, two hours. Two semester credits. Assistant Professor ———.

The fundamental principles of international law and international relations, and rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text: Stockton's *Outlines of International Law*.

Industrial Journalism and Printing

Professor CRAWFORD
Associate Professor ROGERS*
Instructor KEITH
Instructor POLSON
Assistant ALLEN

The work in industrial journalism and printing is designed to accomplish two purposes: the preparation of students who expect to be leaders in industrial, economic, and social life to do occasional writing for newspapers and other periodicals on subjects of special interest; and the training of students fundamentally interested in journalism for positions on farm journals, newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work comprises lectures, discussions, and practice. *The Kansas Industrialist*, the official paper of the College, is under the editorial and mechanical direction of the professor of industrial journalism and superintendent of printing. In it is published acceptable matter prepared by students, who write also for newspapers and other publications.

Attention is given to the mechanical side of the profession in the instruction in printing, two semesters of which are required of all students taking the curriculum in industrial journalism. Printing has been taught in the institution continuously since 1875—the longest period during which the instruction in the subject has been given in any American college. Practical work is done not only on *The Kansas Industrialist*, but in a wide variety of job printing for College departments.

The equipment for instruction in journalism and printing is that of a practical publishing and printing plant. The journalism work room contains typewriters, reference books, "morgue," and files of a large number of agricultural publications, newspapers, and trade journals.

The printing plant contains one two-revolution cylinder press, one

* Beginning July 1, 1919.

drum-cylinder press, three platen presses, two wire-stitching machines, two paper cutters, a folding machine, an interchangeable perforating and punching machine, a quantity of both display and body type, including some of the most modern faces, and a large amount of miscellaneous equipment. All power machines are driven by individual electric motors.

A large amount of timely agricultural and other information is furnished regularly to Kansas newspapers, farm journals, and other publications. Special assignments are covered for these periodicals, and special inquiries are answered.

COURSES IN INDUSTRIAL JOURNALISM AND PRINTING

FOR UNDERGRADUATES

101. PRINCIPLES OF TYPOGRAPHY I. Freshman year, first semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Mr. Keith.

The course comprises a study of the case, the point system, and the measurement of type and stock. The history of printing is presented and a study is made of the development of the various typographical styles. Practice is given in setting straight matter. Emphasis is laid on accuracy.

104. PRINCIPLES OF TYPOGRAPHY II. Freshman year, second semester. Class work, two hours; laboratory practice, three hours. Three semester credits. Mr. Keith.

The work of the preceding term is continued, a study being made of type faces and the typography of advertisements and head display. The principles of effective make-up are treated. The use of cost systems in printing offices receives extensive attention.

107. ELEMENTARY JOURNALISM. Sophomore year, both semesters. Class work, two hours. Two semester credits. Miss Polson.

The course is intended to give the student practical experience in the fundamentals of news writing. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered.

113. INDUSTRIAL WRITING. Sophomore year, second semester. Class work, two hours. Two semester credits. Prerequisite: Elementary Journalism. Miss Polson.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The work of the College and the Experiment Station affords the basis for the study and practice.

121. AGRICULTURAL JOURNALISM. Junior year, both semesters. Class work, one hour. One semester credit. Professor Crawford.

The course is intended to supply students in the course in agriculture with sufficient knowledge of the principles of news writing, as applied to agriculture, to enable them to become occasional contributors to newspapers and farm journals. Much practice in agricultural writing is given in the course.

123. INDUSTRIAL FEATURE WRITING. Junior year, first semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Writing. Professor Crawford.

This course takes up the feature story, with careful attention to both the informative and the entertaining type. The principles underlying the feature story are applied to writing on agricultural and other industrial subjects. The demands of newspapers, farm journals, and general magazines for writing of this character are analyzed.

125. PRINCIPLES OF ADVERTISING. Junior year, second semester. Class work, three hours. Three semester credits. Prerequisite: Industrial Feature Writing. Professor Davis of the Department of English.

This course considers the fundamentals of advertising as a part of modern business. The study of the goods to be advertised, the analysis of the market, the psychology of advertising, the preparation of advertising copy, and other important matters are taken up. The student is required to make application of the principles brought out in the course.

130. TECHNICAL JOURNALISM. Junior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Industrial Feature Writing. Professor Crawford.

The course deals specifically with agricultural journals, trade journals, and other publications of highly specialized character. The writing which is done in the course is done for publications of these types, and the students are required to submit their material to editors. A beginning is made in the study of the desk work required on a technical journal, including the handling of copy, the use of illustrations, and the principles of make-up from the editorial standpoint.

110, 116, 127, 133. JOURNALISM PRACTICE I, II, III, IV. These courses comprise laboratory practice accompanying courses 107, 113, 123, 130. Sophomore and junior years. Six hours. Two semester credits for each course. Prerequisite for each semester is the work of all preceding semesters in Journalism Practice. Professor Crawford and Miss Polson.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the Department workroom. The College campus is divided into "runs," which the students must cover at regular intervals, and assignments are given at specific times. The work given is suited to the advancement of the student. As he progresses in his work he is required not only to obtain news and feature stories, but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

FOR GRADUATES AND UNDERGRADUATES

201. CIRCULATION AND ADVERTISING PROMOTION. Senior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Technical Journalism. Professor Crawford.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing circulation are discussed. The advertising agency, the circulation analysis, and the fixing of advertising rates are treated.

204. COPY READING. Senior year, first semester. Laboratory practice, six hours. Two semester credits. Prerequisite: Technical Journalism. Miss Polson.

The course continues the work begun in Technical Journalism, and gives practice in the work required of the copy reader, whether on a

newspaper, an agricultural journal or some other publication. A study is made of newspaper style and of magazine and book style, the distinction between the two being clearly pointed out. The writing of heads and titles and proof-reading receive detailed attention. A large amount of copy is actually handled in class, and papers of various types are made up as practice assignments.

207. EDITORIAL PRACTICE. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Copy Reading. Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers, and newspapers, but with the conduct of the editorial offices of a periodical publication. Students obtain instruction and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, and exchange matter. The acceptance and rejection of contributions receive consideration. Editorial policies and their influence form the subject of careful discussion.

210. ETHICS OF JOURNALISM. Senior year, second semester. Class work, two hours. Two semester credits. Prerequisite: Circulation and Advertising Promotion. Professor Crawford.

The course treats ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter or staff writer, in the editorial conduct of the paper, and in the handling of circulation and advertising. The federal and state laws relating to periodical publications, to advertising, to libel, and to authors' rights, including the federal law of copyright, are treated. The attitude of periodical publications on matters of ethics and law is observed at first hand by the students.

213. MATERIALS OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Miss Polson.

This is a course intended primarily for the general student who desires to obtain a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention is given to the several types of journalism.

216. MAGAZINE FEATURES. Elective, second semester, on permission of the instructor. Two semester credits. Miss Polson.

The course is intended for advanced students who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

219. HISTORY OF JOURNALISM. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course deals with the history of journalism from its beginning and with the history of printing so far as this is concerned with periodical publications. Most of the time of this course is given to journalism in England, Canada and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century, and the several types which arose because of this are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

222. JOURNALISM SURVEYS. Elective, second semester. Laboratory work, six hours. Two semester credits. Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated, and studies are made of the relation of the reading matter to the industrial, economic, social, and moral life of the communities.

225. CURRENT PERIODICALS. Elective, first semester. Class work, two hours. Two semester credits. Professor Crawford.

The course comprises a study of current periodicals of various types. Special emphasis is laid on the material that they contain and the nature of its appeal to the reader. It is a nontechnical course, intended to give general students some knowledge of the field of current periodical literature.

Library Economy

Librarian SMITH
Associate Librarian DERBY
Reference Assistant CILLEY
Reference Assistant WHITE

The library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSE IN LIBRARY ECONOMY

FOR UNDERGRADUATES

101. LIBRARY METHODS. Freshman year, both semesters. Class work, one hour. One semester credit. Associate Librarian Derby, Miss Cilley and Miss White.

The course consists of lectures on classification and arrangement of books in the library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, and standard works in history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals, etc. Instruction is given also in methods of indexing current reading for purposes of future reference.

Mathematics

Professor REMICK
Professor WHITE
Assistant Professor STRATTON

Instructor FEHN
Instructor HOLROYD
Instructor MCKITTRICK

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold applications. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

COURSES IN MATHEMATICS

FOR UNDERGRADUATES

101. PLANE TRIGONOMETRY. Freshman year, first and second semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Professor White, Assistant Professor Stratton, Mr. Fehn, Miss Holroyd, and Miss McKittrick.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Freshman year, both semesters. Class work, three hours. Three semester credits. Prerequisites: Plane geometry and one and one-half years of high-school algebra. Professor Remick, Professor White, Assistant Professor Stratton, Mr. Fehn, Miss Holroyd, and Miss McKittrick.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Hawke's *Higher Algebra*.

107. COLLEGE ALGEBRA A. Freshman year, second semester. Class work, five hours. Five semester credits. Prerequisites: Plane Geometry and one year of high-school algebra. Professor Remick, Professor White, Assistant Professor Stratton, Mr. Fehn, Miss Holroyd, and Miss McKittrick.

After a brief review of elementary subjects, a thorough treatment of quadratics, ratio, proportion, progressions, and the binomial theorem for positive exponents is given. The remainder of the course follows closely the chief content of course 104. Text: Wells and Hart's *Second Course in Algebra*.

110. PLANE ANALYTICAL GEOMETRY. Sophomore year, first semester. Class work, four hours. Four semester credits. Prerequisites: Plane Trigonometry, and College Algebra. Professor White, Assistant Professor Stratton, and Mr. Fehn.

This course treats of coördinate systems, projections, loci, straight line, conics, parametric and empirical equations, with a discussion of the general equation of the second degree. Text: Bailey and Wood's *Analytic Geometry*.

113. CALCULUS I. Sophomore year, second semester. Class work, five hours. Five semester credits. Prerequisite: Plane Analytical Geometry. Professors Remick and White, and Assistant Professor Stratton.

The usual topics of differential calculus are considered together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text: Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Junior year, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus I. Professors Remick and White, and Assistant Professor Stratton.

In this division of the subject emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

119. CALCULUS. Sophomore year and elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professors Remick and White.

This course is designed especially for students intending to teach secondary mathematics. It includes a brief treatment of the fundamental principles of both branches of calculus, practice with the standard formulas of differentiation and their application to geometry and mechanics. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

122. SPECIAL METHODS IN THE TEACHING OF MATHEMATICS. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry; a study of the report of prominent mathematical organizations, especially those of the international commission; a comparison of the curricula of different schools—these are some of the matters which receive attention. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

125. ANALYSIS OF STATISTICS. Elective, first semester. Class work, three hours. Three semester credits. Professor Remick and Assistant Professor Stratton.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, reading, and recitations.

128. MATHEMATICS OF BIOLOGY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Analytical Geometry. Professor Remick.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. The course is designed to meet the needs of students in biology and is taught largely by the lecture method.

131. INSTITUTIONAL ACCOUNTING. Elective, second semester. Class work, three hours. Three semester credits. Assistant Professor Stratton.

This course treats of accounting for institutions such as colleges, schools, clubs, societies, industrial and social organizations. The practice work includes preparation for publication of statements of income and expenditure, balance sheets, treasurer's reports, financial data and statistics, and of the annual returns of net income required under the federal income-tax law. A study is made of the mathematics of investments, the handling of endowment and trust funds, and the preparation of budgets. The work proceeds by lectures, discussions, written reports, and exercises.

134. ACCOUNTING PRACTICE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Elementary Bookkeeping. Assistant Professor Stratton.

This course includes an analysis of the development and structure of bookkeeping methods, the accounts of single proprietors, partnerships and corporations, the construction of manufacturing and trading profit-and-loss accounts and balance sheets, the analysis of railroad reports and bank statements, including bankruptcy and receivership conditions. The course is designed to give the students power to analyze commercial accounts and statements.

FOR GRADUATES AND UNDERGRADUATES

201. DIFFERENTIAL EQUATIONS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Calculus II. Professor Remick.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics, or engineering. The various standard types of differential equations are considered together with the usual applications. Text: Murray's *Differential Equations*.

204. METHOD OF LEAST SQUARES AND THEORY OF MEASUREMENT. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Calculus II. Professors Remick and White.

This course includes a study of the law of error based on the theory of probability and the probability curve; adjustments of observations by the method of least squares; development of precision measures; distribution of errors; and Gauss's method of substitution in the solution of normal equations. The solution of a number of problems is required.

207. SOLID ANALYTICAL GEOMETRY. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: Plane Analytical Geometry, and Calculus II. Professor White.

The topics treated include coördinates of points in space and their transformations, and involve the usual discussion of lines and planes. The standard types of quadric surfaces are considered together with their classification and principal properties. Text: Snyder and Sisam's *Analytical Geometry of Space*.

FOR GRADUATES

In addition to the preceding courses, more advanced work in mathematics is offered for candidates for the master's degree. Courses are available in the following subjects: 301, Advanced Calculus; 306, Theory of Equations; 311, Theory of Functions of a Complex Variable; 316, Modern Analytical Geometry; and 321, Theoretical Mechanics.

Military Training

MAJOR DAVIDSON (Inf. U. S. A.), Professor of Military Science and Tactics,
Commandant of Cadets
CAPTAIN KEMPER (Inf., U. S. A.), Assistant Commandant, Acting Quartermaster
Associate Professor BROWN, Bandmaster

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curriculum. All young men of age, not physically disqualified, are required to take military training three full hours a week for two years. A student entering as a junior or above is held for military science for the time necessary to complete the remainder of his College course unless this period is reduced by credits accepted from another institution.

Requests for excuse from military science, or for postponement of the work, are acted upon by the President of the College. Such requests are presented through the student's dean, and the President obtains the advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from mili-

tary science on account of physical disability are assigned to an equivalent amount of some other College work instead. Students permitted to postpone military science for any reason are not thereby excused, but must make it up later.

reached the age of twenty-five years.

The act of Congress of June 3, 1916, known as the national defense act, provides for the establishment in civil institutions of a Reserve Officers' Training Corps (R. O. T. C.).

The object of this provision is stated as follows:

"The primary object of establishing units of the Reserve Officers' Training Corps is to qualify, by systematic and standard methods of training, students at civil institutions for reserve officers. The system of instruction herein prescribed presents to these students a standard measure of that military training which is necessary in order to prepare them to perform intelligently the duties of commissioned officers in the military forces of the United States, and it enables them to be thus trained with the least practicable interference with their civil careers.

"Units of the senior division may be organized at civil institutions which require four years of collegiate study for a degree, including State universities and those State institutions that are required to provide instruction in military tactics under the provisions of the act of Congress approved July 2, 1862, donating lands for the establishment of colleges where the leading object shall be practical instruction in agriculture and the mechanic arts, including military tactics.

"Units of the junior division may be organized at any other public or private educational institution."

An infantry unit of the Reserve Officers' Training Corps has been established in this College, the senior division consisting of men in the four years' College curricula and the junior division consisting of the men in the School of Agriculture.

Members of the R. O. T. C. will receive the benefits mentioned below:

1. JUNIOR DIVISION (School of Agriculture). Each student of these classes will be furnished one uniform free. The uniform consists of one coat (wool, O. D.), one pair of breeches (wool, O. D.), one pair of russet shoes, one wool shirt (O. D.), one overcoat, one pair of leggings, one hat, two collar ornaments, and one hat cord (O. T. C.). When this uniform, or any article of it, has been worn out by ordinary wear and tear, and condemned, it will be replaced without expense to the student. The student incurs no obligation except that of properly caring for his uniform and equipment.

2. SENIOR DIVISION, BASIC COURSE (Freshmen and Sophomores). Same as the Junior Division. Furthermore, commutation of subsistence has been recommended for all members of the basic course; the proper action has not as yet been taken to make this effective.

3. SENIOR DIVISION, ADVANCED COURSE (Juniors and Seniors). The student who continues in the R. O. T. C. during his junior and senior years will receive the following benefits:

He will receive the uniform referred to above, on the same terms.

He will be furnished commutation of subsistence, estimated to amount to \$12 a month, provided he executes an agreement to continue in the R. O. T. C. during the remainder of his College course, and to take the

course of camp training during such period, prescribed by the Secretary of War. The camps referred to involve no expense on the part of the student. In addition, a complete summer uniform will be issued. And if Congress acts upon recommendations submitted, additional pay will be given at this time.

After graduation he will be eligible for appointment by the President of the United States as a reserve officer of the Army, and if so appointed he may, under certain conditions, be appointed and commissioned as a temporary second lieutenant in the regular army for a period of six months, with pay at the rate of \$100 per month, with the usual allowances.

In order to continue in the R. O. T. C. during his junior and senior years, the student must have the recommendation of the President of the College and the commandant of cadets.

The corps of cadets at present is organized as a battalion of infantry, four companies. A military band is also provided for, the members of which must be thoroughly trained in military tactics. Assignments to the military band are made upon recommendation of the bandmaster, who has charge of the technical instruction.

Officers and noncommissioned officers are selected from the seniors and juniors by the commandant of cadets, with the approval of the President of the College. This selection is made from among those cadets who have been most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state and the adjutant-general of the Kansas National Guard, while warrants signed by the President of the College and the commandant of cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

Juniors and seniors who are regularly enrolled in the advanced course of the senior division receive two semester credits of elective work toward graduation for each semester of military training taken beyond the basic course.

COURSES IN MILITARY TRAINING

Senior Division, R. O. T. C.

BASIC COURSE

101. MILITARY SCIENCE I. Freshman year, first semester. Lectures, recitations, and military drill, three hours a week. One semester credit. Prerequisite: None.

The work of this course is divided as follows:

(a) *Practical.* Physical drill; infantry drill; school of the soldier, squad and company in close and extended order; preliminary instruction, sighting, position and aiming drills, gallery practice, nomenclature and care of rifle and equipment.

(b) *Theoretical.* Theory of target practice, individual and collective military organization; map reading; service of security; personal hygiene.

102. MILITARY SCIENCE II. Freshman year, second semester. Lectures, recitations and military drill, three hours a week. One semester credit. Prerequisite: Military Science I.

The work of this course is divided as follows:

(a) *Practical*. Physical drill; infantry drill; school of the battalion; ceremonies; manuals; bayonet combat; entrenchment; first-aid instruction; range and gallery practice.

(b) *Theoretical*. Lectures on military policy as shown by military history of the United States, and military obligation of citizenship; service of information; combat; Infantry Drill Regulations, to include the school of the company; camp sanitation for small commands.

103. MILITARY SCIENCE III. Sophomore year, first semester. Lectures, recitations and military drill, three hours a week. One semester credit. Prerequisite: Military Science II.

The work of this course is divided as follows:

(a) *Practical*. Same as 102 (a); combat firing.

(b) *Theoretical*. Infantry Drill Regulations, to include the school of the battalion and combat; Small Arms Firing Regulations; lectures as in 102 (b); map reading; camp sanitation and camping expedients.

104. MILITARY SCIENCE IV. Sophomore year, second semester. Lectures, recitations and military drill, three hours a week. One semester credit. Prerequisite: Military Science III.

The work of this course is divided as follows:

(a) *Practical*. The same as 102 (a); signaling; semaphore and first aid; sand table work; range practice.

(b) *Theoretical*. Lectures on recent military history; service of information and security; marches and camping.

ADVANCED COURSE

105. MILITARY SCIENCE V. Junior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisites: Military Science IV.

This course is divided into—

(a) *Practical*. Duties consistent with rank of cadet officers or non-commissioned officers in connection with courses 101, 102, 103, and 104; military sketching.

(b) *Theoretical*. Minor tactics; field orders; map maneuvers. Company administration, general principles, papers and returns; military history.

106. MILITARY SCIENCE VI. Junior year, second semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science V.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Minor tactics; map maneuvers continued; elements of international law; property accountability and method of obtaining supplies and equipments.

107. MILITARY SCIENCE VII. Senior year, first semester. Lectures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VI.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; proceedings of court-martial; international relations of America from discovery to present day; gradual growth of principles of international law embodied in American diplomacy, legislation and treaties; psychology of war and kindred subjects; general principles of strategy to show relations between the statesman and the soldier.

108. MILITARY SCIENCE VIII. Senior year, second semester. Lec-

tures, recitations and military drill, five hours a week. Three semester credits. Prerequisite: Military Science VII.

The course is divided into—

(a) *Practical*. Same as course 105 (a).

(b) *Theoretical*. Tactical problems; map maneuvers; rifle in war; lectures on military history and policy.

Modern Languages

Professor CORTELYOU
Instructor LIMPER
Assistant HESSE

The study of modern foreign languages serves a number of purposes. It gives the student general training and culture; it throws helpful side lights upon English, his mother tongue; and it gives him important aid in scientific research. It is desired that the instruction in modern languages here given be as practical as possible, without, however, failing to encourage an appreciation of modern foreign literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A number of literary and scientific periodicals published in German and French are received by the College library, and afford the student an excellent opportunity to amplify his reading knowledge of these languages.

Students who have had German or French in high school are required, as a rule, to take more advanced courses as their electives or required work in these languages here.

A realization of the growing importance of our relations with Spanish-speaking peoples has led to the introduction of Spanish courses, which may be taken as electives.

COURSES IN GERMAN

FOR UNDERGRADUATES

101. GERMAN I. Elective, first semester. Class work, three hours. Three semester credits. Professor Cortelyou.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually with the reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term there are included the study of articles, declensions of nouns and pronouns, the indicative mode of weak verbs, sentence order, and the comparison of adjectives. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text: Vos's *Essentials of German* (first eighteen lessons).

102. GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisites: German I, or its equivalent. Professor Cortelyou.

Students are repeatedly drilled on the grammatical constructions already emphasized in German I, of which this course is a continuation. The remaining important grammar points are studied. The general plan of the work is the same as in Course 101. Essential facts of grammar are insisted upon, but German is taught as a living language. Written translations from English into German are frequent. Text, Vos's *Essentials of German* (completed).

103. BEGINNING GERMAN I. Junior year and elective, first semester. Class work, five hours. Five semester credits. Professor Cortelyou.

The greater part of the grammar is taken up in this course. The work includes a study of articles, pronouns, nouns, numerals, sentence order, conjugation of verbs throughout the active voice, and adjective declensions and comparison. Translations of English into German as well as German into English are frequent. Text: Vos's *Essentials of German* (first twenty-seven lessons.)

104. BEGINNING GERMAN II. Junior year and elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Beginning German I, or one year of high-school German. Professor Cortelyou.

The study of grammar is finished, special stress being put upon forms and uses of the subjunctive, forms of the passive voice, substitutions for the passive, mixed verbs, and modal auxiliaries. Grammar points of course 102 are constantly reviewed. Some sight reading and composition work is done. Text: Vos's *Essentials of German* (Lesson twenty-eight to the end.)

111. GERMAN READINGS. Junior year and elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: German II. Professor Cortelyou.

This course embraces readings of easy, idiomatic selections from modern authors. Grammatical drill is continued. German conversations based on the texts read are frequent. Text: *Aehrenlese*, by Bierwirth and Herrick.

FOR GRADUATES AND UNDERGRADUATES

201. GERMAN SHORT STORIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

The material read in this course comprises a number of short stories of considerable interest, by such modern authors as Auerbach, Niese, Goldammer, von La Roche, von Leander, von Scheffel, and von Polenz. Text: Baker's *German Stories*.

206. GERMAN COMEDIES. Elective, both semesters. Class work, three hours. Three semester credits. Prerequisite: Course 111. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively, and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerikanisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, Emil Pohl's *Die Schulreiterin*, and Alexander Elz's *Er ist nicht eifersuechtig*. Exercises in conversation and sight reading are occasionally introduced. Texts: Manley and Allen's *Four German Comedies* and Elz's *Er ist nicht eifersuechtig*.

216. GERMAN HISTORICAL PROSE. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

In this course an insight is obtained of the Prussian government, administration of justice, military system, economic development, and strivings toward national unity as they existed at the time of Frederick the Great. Text: Rogge's *Der grosse Preussenkoenig*, edited by Adams.

221. GERMAN PROSE I. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their

varied activities. The following are studied in this course: visits; the various stores; restaurants, meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society; occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; the country; the German empire; the military system; conversational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text: Kron's *German Daily Life*.

226. GERMAN CLASSICS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 216, 221, or 231. Given in the year 1919-'20 and alternate years thereafter. Professor Cortelyou.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

231. GERMAN PROSE II. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 201 or 206. Given in the year 1920-'21 and alternate years thereafter. Professor Cortelyou.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text: Allen and Batt's *Easy German Stories*, Vols. I and II.

236. SCIENTIFIC GERMAN I. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Course 102 or 106. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles, especially those dealing with chemistry and physics. Text: Dippold's *Scientific German Reader*.

241. SCIENTIFIC GERMAN II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 236. Professor Cortelyou.

This is a continuation of the preceding course. The material studied is of a more general nature than in course 236. Text: Greenfield's *Technical and Scientific German*.

COURSES IN FRENCH

FOR UNDERGRADUATES

151. FRENCH I. Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Mr. Limper and Miss Hesse.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of grammar are covered in this semester and reading matter in the grammar is supplemented by a reader. Texts: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

152. FRENCH II. Sophomore year and elective, both semesters and summer school. Class work, three hours. Three semester credits. Prerequisite: French I. Mr. Limper and Miss Hesse.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

153. BEGINNING FRENCH I. Junior year and elective, both semesters. Class work, five hours. Five semester credits. Mr. Limper and Miss Hesse.

From the start great care is taken in acquiring correct pronunciation. The larger part of the grammar is covered in this course. Considerable time is devoted to oral and written work and to conversation. Easy readings are taken up. Texts: Olmsted's *Elementary French Grammar* (first thirty-seven lessons) and Allen and Schoell's *French Life*.

154. BEGINNING FRENCH II. Junior year and elective, both semesters. Class work, five hours. Five semester credits. Prerequisite: Beginning French I, or one year of high-school French. Mr. Limper and Miss Hesse.

This course is a continuation of Beginning French I. The grammar is completed, especial attention being given to irregular verbs. The grammar points of the preceding course are reviewed and considerable time is devoted to conversation. Much reading is done, the purpose being to enlarge the student's vocabulary. Texts: Olmsted's *Elementary French Grammar* (Lesson XXXVIII to the end); Fontaine's *En France* and one other short reading text.

161. FRENCH READINGS. Elective, first semester and summer school. Class work, three hours. Three semester credits. Prerequisite: French II. Mr. Limper and Miss Hesse.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

FOR GRADUATES AND UNDERGRADUATES

251. FRENCH SHORT STORIES. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Course 154 or 161. Mr. Limper and Miss Hesse.

The purpose of this course is to introduce the student to modern French literature. The modern short story, since it covers so large a range of subjects, also offers excellent material for the enlargement of the vocabulary. Stories by such writers as Daudet, Maupassant and Zola are read.

COURSES IN SPANISH

FOR UNDERGRADUATES

176. SPANISH I. Elective, first semester. Class work, three hours. Three semester credits. Miss Hesse.

In this course nouns, adjectives, pronouns, demonstratives, and numerals are treated and the indicative of verbs is studied. The course is largely conducted in Spanish, the student gradually acquiring a fair-sized and practical vocabulary. Text: Hills and Ford's *First Spanish Course* (first thirty-one lessons).

177. SPANISH II. Elective, second semester. Class work, three hours. Three semester credits. Prerequisite: Spanish I or one year of high-school Spanish. Miss Hesse.

In addition to study of grammar, which is here completed, considerable reading is done. Stress is laid upon training the ear to understand spoken Spanish. Texts: Hills and Ford's *First Spanish Course* (completed), and Bergé-Soler and Hatheway's *Elementary Spanish-American Reader*.

FOR GRADUATES AND UNDERGRADUATES

276. SPANISH READINGS. Elective, first semester. Class work, three hours. Three semester credits. Prerequisite: Spanish II. Miss Hesse.

A thorough study is made of one or two of the best works in Spanish literature from the more modern writers. One hour a week is devoted entirely to conversation and composition, the subjects being taken from current topics of the day.

Music

Professor WESTBROOK
Associate Professor BROWN
Instructor ABERNETHY*
Instructor BUGBEY
Instructor JOHNSTON

Instructor KIMMELL
Instructor SMITH
Miss HUGHES
Miss CURRY

The aim of the Department of Music is to become of vital value in the life of every student. The department strives to create and foster a love and appreciation for the best in music and to give to students that broader culture and more complete education which is gained through academic and professional and vocational training combined with musical and artistic study. Believing that this can be accomplished to a much greater degree by having artistic performers among us, courses are offered which will prepare those who so desire to be efficient in some chosen musical line. Students enrolled in the Department participate in the musical contributions to the public programs of the College, and such participation is a part of their training and duty.

METHODS OF INSTRUCTION

Instruction in voice and instrumental music is given in private lessons. No two students have the same mental, physical or artistic capacity, and their individual capabilities can be neither properly nor fully developed without painstaking personal attention. The best results are dependent on a close adaptation to the individual needs of the pupils, and this, of course, cannot be gained in classes, as is the case in the individual lessons. The effectiveness of the methods used is demonstrated by the interest and progress of the pupils.

All theoretical work is taught in classes. These and other classes in the Department of Music are free to any student in the institution.

CREDITS

Students taking work in the Department of Music are allowed credits on their work in the Divisions of General Science, Home Economics, and Agriculture, while substitutions in music, with the approval of the Dean, may be made in the Division of Engineering, as follows: For Voice or some instrument, two hours each semester; for Musical History, two hours each semester; for Harmony, two hours each semester; for Coun-

* Resigned June 30, 1919.

terpoint, Musical Form and Musical Analysis, two hours each semester; for Chorus, Orchestra or Band, one hour each semester; for Public School Music Methods, two hours each semester. Any student having a full assignment may, upon recommendation of the Director of Music together with the approval of the student's Dean, take music without credit.

Students coming from other schools to take up our curriculum in applied music may be sufficiently advanced as players or singers to enter the second or third year of the regular curriculum but prohibited therefrom owing to their lack of knowledge of theory. If such students enter the first year of the theoretical course, their progress as players and singers is not retarded, but it would be much to their advantage to make special theoretical preparation in the hope of qualifying for more advanced standing.

CURRICULUM IN APPLIED MUSIC

By applied music is meant the practical and scientific study of voice, piano, violin, violoncello, organ, or some band instrument, in private individual lessons, together with the study of theoretical subjects in classes. The course is designed to fit students not only to be artistic soloists, but also to be efficient teachers of their chosen instrument.

In addition to the requirements outlined below, a high-school education or its equivalent is necessary for a certificate. As to the length of time it takes to complete this course satisfactorily, much depends upon the natural ability of the pupil, the intensity of his application, and the time he spends in developing the art of his particular instrument. Qualifications of students wishing to enter upon the work of this curriculum will be judged by the Director of Music. Those not qualified to take up the curriculum in applied music will be regarded as preparatory students until their work justifies a change in classification. Each candidate for a certificate must give a public recital some time during the second semester of his third year.

Outline of Curriculum in Applied Music

FIRST YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two semester credits.
 Harmony I. Two one-hour recitations a week. Two semester credits.
 Ear Training and Sight Singing I. Two one-hour recitations a week.
 Musical Appreciation I. One one-hour recitation a week.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying. One semester credit.
 College Rhetoric I. Three one-hour recitations a week. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two semester credits.
 Harmony II. Two one-hour recitations a week. Two semester credits.
 Ear Training and Sight Singing II. Two one-hour recitations a week.
 Musical Appreciation II. One one-hour recitation a week.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying. One semester credit.
 College Rhetoric II. Three one-hour recitations a week. Three semester credits.
 Physical Education.

SECOND YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two semester credits.
 Harmony III. Two one-hour recitations a week. Two semester credits.
 Musical History I. Two one-hour recitations a week. Two semester credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying. One semester credit.
 Recital.
 German I. Three one-hour recitations a week. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two semester credits.
 Harmony IV. Two one-hour recitations a week. Two semester credits.
 Musical History II. Two one-hour recitations a week. Two semester credits.
 Ensemble. Choral Society, orchestra, band, glee club, or accompanying. One semester credit.
 Recital.
 German II. Three one-hour recitations a week. Three semester credits.
 Physical Education.

THIRD YEAR

FIRST SEMESTER:

Voice or some instrument. Two lessons a week. Two semester credits.
 Counterpoint. Two one-hour recitations a week. Two semester credits.
 Ensemble. Choral Society, orchestra, band, glee club or accompanying. One semester credit.
 Recital.
 Practice Teaching I.
 Psychology. Three one-hour recitations a week. Three semester credits.

SECOND SEMESTER:

Voice or some instrument. Two lessons a week. Two semester credits.
 Musical Form and Musical Analysis. Two one-hour recitations a week. Two semester credits.
 Ensemble. Choral Society, orchestra, band, glee club or accompanying. One semester credit.
 Recital.
 Practice Teaching II.
 Educational Psychology. Three one-hour recitations a week. Three semester credits.
 Harmonics. Two one-hour recitations a week. Two semester credits.

Upon the approval of the Dean of the Division of General Science and the Director of the Department of Music, substitutes in collegiate subjects such as German, English, etc., as outlined above, may be made, these substitutes to be made in literary lines.

A certificate is awarded to students who complete the curriculum in music as outlined in the foregoing statement.

CURRICULUM IN PUBLIC-SCHOOL MUSIC

For those wishing to prepare themselves to teach music in the public schools a curriculum in public-school music, as outlined below, has been prepared. The completion of a four-year high-school course or its equivalent is required before entering on the work here outlined. To those satisfactorily completing this curriculum a State teacher's certificate in music is granted.

Outline of Curriculum in Public-school Music**FIRST YEAR****FIRST SEMESTER:**

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods I. Two semester credits.
 Harmony I. Two semester credits.
 Ear Training and Sight Singing I. Two semester credits.
 Psychology. Three semester credits.
 Chorus. One semester credit.
 Musical Appreciation I. One semester credit.
 College Rhetoric I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods II. Two semester credits.
 Harmony II. Two semester credits.
 Ear Training and Sight Singing II. Two semester credits.
 Chorus. One semester credit.
 Musical Appreciation II. One semester credit.
 Methods in Teaching. Three semester credits.
 College Rhetoric II. Three semester credits.
 Physical Education.

SECOND YEAR**FIRST SEMESTER:**

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods III. Two semester credits.
 Harmony III. Two semester credits.
 Chorus. One semester credit.
 Musical History I. Two semester credits.
 Educational Administration. Three semester credits.
 French I. Three semester credits.
 Physical Education.

SECOND SEMESTER:

Voice. Two lessons a week. Two semester credits.
 Piano. One lesson a week. One semester credit.
 School Music Methods IV. Two semester credits.
 Harmony IV. Two semester credits.
 Chorus. One semester credit.
 Musical History II. Two semester credits.
 French II. Three semester credits.
 American Literature. Three semester credits.
 Physical Education.

THEORETICAL COURSES IN MUSIC

The aim of theoretical courses is primarily to give the student an intelligent conception of music as a science, and give him such working knowledge of the material of music as will fit him for intelligent appreciation, criticism and interpretation; and secondarily, to form a broad foundation for later study in composition.

101, 102. HARMONY I AND II. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Miss Bugbey.

This course consists of a study of the following: Scales and intervals; primary and secondary triads and their inversions; harmonizing of given

basses and melodies; chords of the dominant seventh; secondary seventh chords; modulation; original work begun; ear training; key-board harmony.

103, 104. HARMONY III AND IV. Elective, beginning first semester and continuing throughout the year. Class work, two hours. Two semester credits for each course. Prerequisite: Harmony II. Miss Bugbey.

This course includes a study of the following: Modulations, continued; altered chords; suspensions; foreign tones; pedal points; figuration; accompaniments; original work; ear training; elementary harmonic analysis; elementary analysis of form.

105, 106. EAR-TRAINING AND SIGHT SINGING I AND II. Elective for all students; required with Harmony I and II for music students. Class work, two hours. No College credit, but required in the music curriculum. Miss Bugbey.

This course is a study in reading and hearing intervals and chords.

107. COUNTERPOINT. Elective, first semester. Class work, two hours. Two semester credits. Prerequisite: Harmony IV. Miss Bugbey.

The course in counterpoint consists of the study of simple counterpoint in two parts; first, second, third, fourth and fifth species, and florid counterpoint.

109. MUSICAL FORM AND MUSICAL ANALYSIS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisites: Harmony IV and Counterpoint. Miss Bugbey.

Chord reading and the accounting theoretically for every note in a piece of music, combined with analytical study of hymn tunes, preludes, inventions, and dance forms of Bach, small instrumental forms, song forms, sonata forms, cantata and oratorio forms are the substance of this course.

110, 111. HISTORY OF MUSIC I AND II. Elective, beginning first semester and continuing throughout the year. Students may enter at the beginning of either semester, however. Class work, two hours. Two semester credits for each course. Miss Bugbey.

A modern text forming the basis of this work is supplemented by lectures and library research. Time is given to the early and primitive development of the art, but special stress is laid upon the classical, Roman and modern periods, together with the present-day conditions and tendencies. In addition to theses upon the general historical and critical subjects, the class is also given practice in journalistic criticism of concert and recital performances.

115, 116. MUSICAL APPRECIATION I AND II. Elective. Class work, one hour. Students may enroll at the beginning of either semester. One semester credit for each course. Miss Bugbey.

Music is a language, and like language must be learned by hearing. As it is the sole design of this course to facilitate intelligent listening, the student's powers of imagination and observation are appealed to at once.

The work is presented in a nontechnical way, in the form of illustration from a talking machine. The subjects treated are melody, rhythm, form, cadence, classical and romantic ideals, present-day tendencies, songs, piano, violin, orchestra, band, chorus, opera, etc., and differences in concert and recital programs.

Several different hours are devoted to this work, so that many students may be accommodated at periods which will suit their convenience.

120, 121. SCHOOL MUSIC METHODS I AND II. First semester and continuing throughout the year. Lectures and research, three hours. Two semester credits for each course. Miss Hughes.

These courses deal with the place of music and the teacher in the school and in the community.

122, 123. SCHOOL MUSIC METHODS III AND IV. First and second semesters, respectively. Lectures, research, and practice teaching, three hours. Two semester credits for each course. Miss Hughes.

These courses are a continuation of School Music Methods I and II.

PRACTICAL COURSES IN MUSIC

130. VOICE. Two private lessons a week. Two semester credits. Elective in College curricula. Professor Westbrook, Mr. Johnston, and Miss Kimmell.

The course of instruction is based primarily upon the Italian school for training voices. Correct tone placement, so that the pupil produces tones throughout all registers with ease, and with firm, even quality, is the foundation of good singing. During the first year especial attention is given to a systematic course in breathing, tone placement and analysis of vowels and consonants relative to vocal needs. At all times attention is given to perfect enunciation, and German, French and Italian diction is taught in connection with actual song coaching. The song literature of America, England, Germany, France and Italy is studied, and a satisfactory performance of songs, oratorio or operatic arias from each one of these schools is necessary. Students specializing in voice in this course are expected to be or become able to play simple accompaniments.

135. VIOLIN. Two private lessons a week. Two semester credits. Elective in College curricula. Associate Professor Brown and Miss Bugbey.

In this department the aim is to teach the fundamentals of violin playing in such a manner as to lay the foundation of intelligent musicianship. In this work, as in the other lines of musical endeavor, mastery of the instrument is a task which imposes different difficulties upon every student. Natural ability, physical characteristics and the general make-up of the individual so influence progress that no definite method of instruction can be outlined which can be profitably pursued by all players. However, particular attention is paid to the correct position of the student while playing, and also to the manner of holding the violin and bow. A graceful and natural method of playing is insisted upon, and great care is exercised to develop an accurate feeling for good intonation. Elementary scale work is begun at an early period and is gradually extended. Studies and exercises from the best writers are selected and, as the student develops, the entire field of violin literature is open for study.

Violoncello, viola and contrabass receive the same attention in this department as does the violin.

140. PIANO. Two private lessons a week. Two semester credits. Elective in College curricula. Misses Abernethy and Smith.

The methods of instruction in this department are direct and simple. Pupils are taught not only to play, but also to think logically according to the scientific principles of the art. Thus is developed definite and intelligent teaching ability as well as sound artistic performance. A technical foundation is the first requisite in modern piano playing. This is accomplished by a carefully selected and graded set of exercises and studies, designed to bring about that mental control of muscles without which artistic results cannot be obtained. Clearness of conception, distinctness of phrasing, variety of tone, good rhythm and technical accuracy are insisted upon. As the student advances, difficult compositions of both the classic and modern writers are studied. Interpretation becomes a special study, and all the emotional, intellectual and physical faculties are brought into that harmony and control which alone results in artistic performance. Opportunity is offered for study of accompaniments and piano ensemble.

145. WIND INSTRUMENTS. Two private lessons a week. Two semester credits. Elective in College curricula. Associate Professor Brown.

In this department opportunity is offered for the study of any wind instrument. Both the Albert and Boehm systems of clarinet playing are taught, while the semi-no-pressure system of cornet playing is used. In this as in other departments the work is taught beginning with elementary scale and technical study and extending over the more difficult literature written for wind instruments. Instruction in instrumentation, conducting and formation of bands is also given.

MUSICAL ORGANIZATIONS

Every voice and each instrument has a distinct function in the science of tonal expression, and only in the combination of voices and instruments are the finest effects in the coloring of melody, harmony and rhythm produced. This combination is made possible in the Department of Music by the number of students enrolled in the College and by the variety of ensemble organizations.

150. THE CHORAL SOCIETY. Throughout the year. Weekly rehearsals, all special rehearsals and public performances. One credit each semester.

This organization, which is conducted by Professor Westbrook, numbers about two hundred, and is one of the best student singing organizations in the West. The rehearsals are held Monday evening, weekly, and part songs, madrigals, glees, cantatas, and the great oratorios are studied, and presented publicly with the assistance of the orchestra and visiting artist soloists.

151. THE ORCHESTRA. Regular rehearsals, all special rehearsals and public performances. One credit each semester.

The orchestra is conducted by Associate Professor Brown, teacher of stringed instruments. It is a definite organization wherein discipline prevails and permanent membership with regular attendance is insisted upon. This body maintains a correct and well-balanced instrumentation, containing all the instruments of the modern symphony orchestra. The work is highly educational, and offers in the preparation for concerts and performances with the choral society the actual experience and routine necessary for efficient orchestra playing. Membership is open to all in the College who are capable of playing acceptably.

152. THE MILITARY BAND. Regular rehearsals, special rehearsals and public performances. One credit each semester.

The band is a part of the cadet corps, and practice in the band is accredited through the Department of Military Science in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to the cadet regulations. The band furnishes music for all ceremonies of a military character and for various other College occasions.

THE APOLLO CLUB. The Apollo Club consists of about thirty of the best men's voices in the institution. The try-out for this singing body is held in the first semester of each year and the club is chosen from a large number seeking admission. A "waiting list" is maintained, and a place made vacant in the club by a member who drops out is immediately filled by one of this list.

The singing of the Apollo Club is characterized by striking vigor, spontaneity, clear enunciation, shading and color, all of which are vital elements in artistic singing. This organization is available for a limited number of concert engagements and recitals throughout the State.

THE ST. CECILIA CLUB. This is a singing organization of young women, and is without doubt one of the finest organizations of its kind in the West. The voices are selected with the utmost care as to range,

blending qualities and special adaptability to the work, thus securing an almost perfect ensemble. The St. Cecilia and Apollo clubs are combined for special choir singing.

RECITALS AND CONCERTS

Unusual advantages for hearing good music are afforded at this institution. In addition to numerous choral, orchestra, band and glee-club concerts given, in which the leading soloists of the country are heard assisting, a number of great artists are brought to our College in the Artist Series Course, and during Spring Festival Week. There are also numerous recitals by the members of the conservatory faculty and by students.

FEES

For a semester of eighteen weeks:

Voice, two lessons a week with the Director.....	\$38.00
Voice, one lesson a week with the Director.....	20.00
Organ, band or orchestral instruments, two lessons a week with Mr. Brown..	28.00
One lesson a week in same with Mr. Brown.....	15.00
Voice, violin or piano, two lessons a week, according to the teacher chosen	\$28.00, \$25.00, or 22.00
One lesson a week in same, according to teacher chosen,	15.00, 13.50, or 12.00

Physical Education and Athletics

Professor CLEVENGER
 Assistant Professor SCHULZ
 Assistant Professor LORING*
 Assistant Professor BOND

The purpose of this Department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable physical preparation for life. It is an urgent necessity that each student have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

PHYSICAL EDUCATION FOR MEN

Physical education is required of all freshmen and sophomores unless excused for disability by the College physician. After completing the requirement, advanced work may be elected for a total of four hours of credit.

PHYSICAL EXAMINATIONS

The work of the Department is based largely upon a physical examination given each student when he enters upon the work of the Department. A second examination is given at the close of his first year. All students, whether taking work in the Department or not, are entitled to receive a physical examination, and advice as to their physical condition.

* Resigned June 30, 1919.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional conditions, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs, tastes, and capabilities. Delicate students and those suffering from functional disorders receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams should enroll in the Department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more sports during the school year must undergo a physical examination preliminary to participation in each sport. This is required in order that no student may engage in athletics to his own permanent physical injury. Each student may secure a copy of his physical measurements, and an anthropometric chart, showing in graphic form his development as compared with that of the average man.

Members of the teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course at least two semesters' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application, but practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

INSTRUCTION IN PHYSICAL EXERCISE

This course furnishes instruction in all the various grades of gymnastic and athletic exercises offered by the Department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

103. PHYSICAL EDUCATION M-I. Freshman year, first semester. Two hours a week. Assistant Professor ———.

Hygiene and social problems are discussed as an essential part of this course. This instruction gives an insight into the practical problems of daily healthy living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in College, as well as for gaining the highest development of vital power and health for future duties.

During the winter the practical work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism. During the fall a man may select Rugby football or soccer football. Beginning about December first the work consists of the following:

a. *Free Calisthenics*. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing

difficulty. They involve hygienic or body-building work, educative movement, and corrective or remedial exercise. Both the Swedish and the German systems are used.

b. *Light Apparatus.* Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

c. *Heavy Apparatus.* Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

d. *Indoor Athletics.* Instruction is given in all indoor track events preparatory to indoor track meets.

e. *Games.* There are included basket ball, indoor baseball, volley ball; also other games of more recreative nature.

104. PHYSICAL EDUCATION M-II. Freshman year, second semester. Two hours a week. Assistant Professor ———.

This course is a continuation of Physical Training M-II. Baseball, track and field athletics are given in the spring as soon as weather conditions permit outdoor work. A part of the regular instruction for the spring semester is in swimming. A passing grade must be made in this phase of the work also.

105. PHYSICAL EDUCATION M-III. Sophomore year, first semester. Two hours a week. Assistant Professor ———.

This course is a continuation of Physical Education M-II. It is required of all young men of the sophomore class.

106. PHYSICAL EDUCATION M-IV. Sophomore year, second semester. Two hours a week. Assistant Professor ———.

This course is a continuation of Physical Education M-III. It is required of all young men of the sophomore class.

110. ADVANCED APPARATUS I. Elective, first semester. Three hours a week. One semester credit. Assistant Professor ———.

This course is open only to those men who show ability as gymnasts. From this class men are picked for the gymnastic team. Tumbling and work on the various pieces of apparatus are given.

111. ADVANCED APPARATUS II. Elective, second semester. Three hours a week. One semester credit. Assistant Professor ———.

This is a continuation of Advanced Apparatus I.

120. PHYSICAL TRAINING SPECIALTIES. Under this head come fencing, boxing, wrestling, offered as advanced work to those who have had not less than two semesters of work in the gymnasium. Hours are arranged with the instructor.

ATHLETICS

DEPARTMENTAL ATHLETICS. In the fall and in the spring the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basketball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basketball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it cannot be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

INTRAMURAL ATHLETICS. All athletics within the institution, including the School of Agriculture teams, come directly under the supervision of the Department of Physical Education. It is the aim of the Department to furnish an opportunity for all students to participate in some form of healthy athletic competition. To carry out the above aim class football is maintained during the fall among the different classes of the College, also among the different classes of the School of Agriculture. Basketball also is promoted during the fall and early part of the winter among the different fraternities, different classes, and different cadet companies, as well as among the students of the different departments of the College.

The work of the spring is largely given over to competition in baseball among the different classes, both in the College and School of Agriculture, the different departments of the institution and boarding-house teams. It is the aim of the Department, too, to revive an interest in track athletics among the different classes of the institution. All these activities as promoted will be run, as nearly as possible, on a tournament plan, making it possible for a large majority of the students to participate in some form of activity. Suitable trophies will be presented and suitable emblems will be granted to participants on winning teams.

In addition to interclass competition there will be a small outside schedule for the School of Agriculture in the different forms of athletics promoted by the Department.

By action of the Student Council, approved by the Faculty, the following rules govern class athletic contests:

1. Managers of class teams are required to play only men who hold assignments to the class with which they play.
2. The requirements for participation in class games are the same as for varsity teams.
3. The respective managers of class athletics are required to present a certified list of eligible players to each other at each game.
4. No man who has been a member of the varsity squad during a given season shall participate in a class game during that season.
5. No man shall participate in a class game who has won a K in that sport.

INTERCOLLEGIATE ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon college life, and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical-education system and a healthy system of sport. Intercollegiate contests are scheduled for football, basketball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

Intercollegiate athletics are placed under the supervision of the Athletic Board by an order of the Board of Administration. This Athletic Board consists of the President of the College, four other members of the faculty appointed by the Board of Administration, and one member from each College class, elected by his class.

Participation in intercollegiate athletic contests is fixed by the following Missouri Valley Conference rules:

1. No student is eligible who receives pay from his institution as a regular instructor.
2. No student is eligible who receives pay for his services as player or manager of his team.

3. No student who has received pay for his athletic skill or knowledge is eligible to participate in any intercollegiate contest (except for summer baseball prior to 1912).

4. No student shall participate in contests as a member of an athletic team except on his home baseball team. No student shall play under an assumed name.

5. No student shall participate in intercollegiate sport for more than three years.

6. No graduate student shall participate in any intercollegiate contest.

7. No student shall participate in intercollegiate contests who has not been in attendance one full year prior to the date of contests, who has not passed in his entrance requirements, who has not passed in at least 30 semester hours' work during the year previous to the contest, and who is not maintaining passing grades in 12 credit hours during the current semester.

8. No person who, having participated in any intercollegiate contest, fails to remain in College the remainder of that semester, unless excused by his Dean for sickness, or other sufficient reason, shall participate again until he shall have completed six months of work following his last participation.

PHYSICAL EDUCATION FOR WOMEN

All young women in the College are required to take two years of physical education unless excused by the Dean of Women.

After the two years' required physical education have been completed, women have the privilege of electing physical education for a total of four credit hours; such elective work must be approved by their Dean. Athletic Association points are awarded for elective work.

PHYSICAL EXAMINATION

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes a system of body measurements, strength tests, and examination of the condition of the heart and lungs. Physical defects, abnormalities and weaknesses are noted, and special exercises are provided for the student needing the individual corrective work.

A suit has been adopted which consists of an all-white middie blouse, black tie, and black-plaited bloomers. White tennis shoes with white rubber soles are used. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert, according to a pattern approved by the Department of Physical Education, or a one-piece gray knit suit. Girls should not buy their swimming suits before arriving in Manhattan. For further information address Women's Department of Physical Education, K. S. A. C., Manhattan, Kan.

INSTRUCTION IN PHYSICAL EDUCATION

151A. PHYSICAL EDUCATION W-I. Freshman year, first semester. Lectures and gymnasium, three hours. One semester credit. Dean Van Zile, Assistant Professor Loring, and Miss Bond.

Instruction in hygiene and social problems is an essential part of this course. In these lectures, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious,

respectful consideration of social and sex hygiene are presented. This part of the course is given by Dean Van Zile of the Division of Home Economics.

The physical training part of the course is divided into two hours a week of regular gymnasium work and one hour of esthetic dancing, folk dancing, games, tennis, hockey, basket ball, or swimming. Classes are in part held out of doors as long as the weather permits.

152A. PHYSICAL EDUCATION W-II. Freshman year, second semester. Gymnasium, three hours. One semester credit. Prerequisite: Physical Education W-I. Assistant Professor Loring and Miss Bond.

In this semester the marching tactics, floor work, etc., are continued for two hours a week, and basket ball, games, esthetic dancing, folk dancing, tennis, and swimming are carried on for one hour a week.

153, 154. PHYSICAL EDUCATION W-III AND W-IV. Sophomore year, first and second semesters, respectively. Gymnasium, three hours. One semester credit. Assistant Professor Loring and Miss Bond.

The work in these two courses is a continuation of that of courses 151A and 152A. More advanced work in marching tactics and in apparatus is here given.

155. SWIMMING W. Open to all women students in the College.

This is a course in swimming in which individual instruction is given.

Physics

Professor HAMILTON
~~Assistant Professor FLOYD*~~
Associate Professor RABURN

Assistant Professor STEWART
Assistant Professor SMITH

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the Department to meet the exact conditions and equipment of the laboratory. A deposit of \$2 a semester is required to cover the cost of supplies and breakage.

COURSES IN PHYSICS

FOR UNDERGRADUATES

101. HOUSEHOLD PHYSICS. Freshman year, both semesters. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: One year of high school physics or its equivalent. Professor Hamilton and Associate Professor Floyd.

* Absent on leave, 1919-'20.

This course consists of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting, and illumination, and of cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

111. AGRICULTURAL PHYSICS. Sophomore year, first semester. Class work, three hours. Three semester credits. Associate Professor Raburn and Assistant Professor Stewart.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm. Text: Spinny's *Physics*.

120. PHOTOGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Training in physics and chemistry. Professor Hamilton.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: Things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

130. WIRELESS TELEGRAPHY. Elective, both semesters. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Elementary Physics. Professor Hamilton and Assistant Professor Stewart.

The work includes a study of the most efficient types of receiving and transmission sets, a study of the fundamental principles of electric waves, and of the most important points to be observed in the erection of a good plant.

Laboratory.—The student learns in the laboratory to receive and to transmit messages, and as he learns the code he is instructed in field work.

FOR GRADUATES AND UNDERGRADUATES

201. GENERAL PHYSICS I. Sophomore year, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: Elementary Physics and Plane Trigonometry. Associate Professors Raburn and Floyd, and Assistant Professor Stewart.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible the general principles involved in mechanics, sound, and heat. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

202. GENERAL PHYSICS II. Sophomore year, second semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisite: General Physics I. Associate Professors Raburn and Floyd, and Assistant Professor Stewart.

This course includes a study of the theory of electricity and light. The class follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text: Reed and Guthe's *College Physics*.

Laboratory.—The work follows the subjects presented in the class and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

211. ENGINEERING PHYSICS I. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisites: Elementary Physics and Trigonometry. Professor Hamilton, Associate Professor Raburn, and Assistant Professor Smith.

This course in mechanics, sound and heat is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Text: Kimball's *College Physics*.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics and heat. Accurate measurements and carefully recorded data are required.

212. ENGINEERING PHYSICS II. Sophomore year, both semesters. Class work, four hours; laboratory, three hours. Five semester credits. Prerequisite: Engineering Physics I. Professor Hamilton, Associate Professor Raburn, and Assistant Professor Smith.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have direct bearing upon light as a standard and method of measurement, are treated in this course. Text: Kimball's *College Physics*.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

213. ACOUSTICS. Junior year, first semester. Class work, one hour. One semester credit. Prerequisite: Engineering Physics II. Associate Professor Floyd.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

221. MOLECULAR PHYSICS. Elective, first semester. Class work, three hours; laboratory, three hours. Four semester credits. Prerequisites: College Physics and College Chemistry. Associate Professor Floyd and Assistant Professor Stewart.

This course includes a study of molecular kinetics of gases, liquids and solids; liquid-gas systems; crystal-gas systems; crystal-liquid systems; Brownian movement; solutions, osmosis, and electrolytic conduction.

Laboratory.—The laboratory work is based on the theory as given in the class work, and includes the determination of capillary constants, molecular conductivities, percentage ionization, and specific heats of gases.

222. HARMONICS. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: One year each of music and elementary physics. Professor Hamilton and Associate Professor Floyd.

This course is given to students of music so that they may learn the fundamental principles of sound that are associated with harmony. It is a lecture and demonstration course that deals with many facts of interest relating to the construction of scales and chords. A clearer understanding of composition and of tone quality may be had if the physical laws of sound are understood.

223. PHYSICAL MEASUREMENTS. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. Professor Hamilton and Associate Professor Floyd.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

224. SPECIAL METHODS IN THE TEACHING OF PHYSICS. Elective, second semester. Class work, two hours; laboratory, three hours. Three semester credits. For credit towards the State teachers' certificate this must be taken in the student's senior year. Prerequisites: Educational Psychology, and College Physics. Associate Professors Floyd and Raburn.

This course is intended for those who are either teaching or expecting to teach physics in secondary schools. The class work includes an analysis of the present status of physics and of physics instruction in our high schools, and is based upon a critical study of the State text as well as other modern texts that may be used as reference. Special effort is made to vitalize the work and to make it apply to everyday life. Lectures, library work, demonstrations and practice teaching are used as methods of directing the course.

Laboratory.—The laboratory work includes the formation and adaptation of courses suitable for either rural or city high schools.

Public Speaking

Professor BURNS

It is the constant effort of the Department of Public Speaking to relate the training in public speaking with the work of all the other departments of the College; to harmonize it with the spirit of the College, which is distinctly technical and industrial. With this object in view, students are trained in the presentation and discussion of the valuable ideas acquired in their various fields of study. The method pursued in this training is that of actual practice on the platform before an audience. Conviction, not entertainment, is the dominant purpose in every case.

The Department seeks to place itself at the service of those various organizations of the College which desire or need its assistance. In addition to its regular courses it aims to make itself available as far as

possible for individual rehearsals; for the training of the debaters and orators of the College; and for the directing and coaching of plays. Students are urged to ally themselves with the organizations representing these various activities.

COURSES IN PUBLIC SPEAKING

FOR UNDERGRADUATES

101. PUBLIC SPEAKING I. Elective, both semesters. Class work, two hours. Two semester credits. Professor Burns.

The purpose of this course is to enable the student to attain some proficiency in the art of oral interpretation. The training given seeks to develop a natural style. In connection with the practice work upon the platform the student is given such points of theory and such routine drill as are necessary for the development and use of the voice and for proper platform deportment.

102. PUBLIC SPEAKING II. Elective, both semesters. Class work, two hours. Two semester credits. Prerequisite: Public Speaking I, or by arrangement with the head of the department. Professor Burns.

This course is a continuation of Public Speaking I, and involves a more advanced study of the art of oral interpretation.

FOR GRADUATES AND UNDERGRADUATES

201. EXTEMPORE SPEECH I. Freshman and junior years and elective, both semesters. Class work, two hours. Two semester credits. Professor Burns.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticism and points of theory given by the instructor supplement the course.

202. EXTEMPORE SPEECH II. Elective, second semester. Class work, two hours. Two semester credits. Prerequisite: Extempore Speech I, or its equivalent. Professor Burns.

This course is a continuation of Extempore Speech I. The same methods are pursued but special attention is given to the telling of humorous stories, to after-dinner speaking, and the like.

203. ADVANCED PUBLIC SPEAKING. Elective, second semester. One semester credit. Prerequisites: Extempore Speech I and II, or by special arrangement with the head of the Department. Professor Burns.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the semester. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks, or addresses suitable for extension work.

Zoology

Professor NABOURS
Professor ACKERT
Associate Professor HARMAN
Instructor MUTTKOWSKI

Instructor BROWN
Assistant ANDREWS
Assistant HURD

The courses have been planned to give a fundamental knowledge of the structures, functions and relations of animals; information concerning the manner in which animals respond to the conditions of the environment; an appreciation of their human values; and a consideration of the problem of heredity and evolution.

The courses in General Zoölogy (101 and 102, and 105) constitute a general survey, and form an excellent introduction to all lines in agriculture, general science, and home economics. Embryology (117), Cytology (214), Advanced Mammalian Embryology (220), Parasitology (123), Evolution and Heredity (217), and Paleontology (Geology 201) are preliminary to advanced work in animal breeding, animal husbandry, dairy husbandry and veterinary medicine. Selections may be made among these courses and Advanced Zoölogy (201, 202), Invertebrate and Vertebrate Taxonomy (205, 208), Economic Zoölogy (126), Ecology (211), Embryology and Physiology (108), Zoölogical Problems (129), Research in Zoölogy (301), and the Seminar (236), by those who expect to do advanced work in zoölogy or entomology, or become teachers of biology.

The classrooms and laboratories are equipped with charts, models, microscopic binoculars, microtomes, paraffin baths and other apparatus both for elementary and advanced work, and a good natural-history museum is available.

COURSES IN ZOÖLOGY

FOR UNDERGRADUATES

101 and 102. GENERAL ZOÖLOGY I AND II. Sophomore year and elective, first and second semesters, respectively. Class work, two hours; laboratory, three hours. Three semester credits for each course. Professor Nabours, Professor Ackert, Associate Professor Harman, Doctor Muttkowski, and Miss Brown.

In General Zoölogy I an elementary study is made of the structures and functions of types selected to illustrate the invertebrates; in course 102 an elementary study is made of the structures and functions of types selected to illustrate the development of the phylum chordata.

Laboratory.—The form and activities of animals are observed both in the field and in the vivaria, and important systems of those animals selected as types are dissected and sketched.

105. GENERAL ZOÖLOGY. Sophomore year, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Men and women in separate classes. Professor Nabours, Professor Ackert, Associate Professor Harman, Doctor Muttkowski, and Miss Brown.

The structures and functions of types of both invertebrates and vertebrates are studied.

Laboratory.—Studies of the form and function of types of living animals, and dissection and reconstruction of the important systems of selected types.

108. EMBRYOLOGY AND PHYSIOLOGY. Sophomore year and elective, both semesters. Class work, three hours; laboratory, six hours. Five semester credits. Prerequisites: Zoölogy 105 or equivalent, and Chemistry 121. Professor Nabours, Professor Ackert, Associate Professor Harman, Miss Brown, and Miss Andrews.

The first three-fifths of the semester is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human species; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urinogenital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations; and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory and other systems.

111. GENERAL ZOÖLOGY VET. Freshman year, first semester. Class work, two hours; laboratory, three hours. Three semester credits. Given concurrently with Veterinary Medicine 201. Professor Ackert and Doctor Muttkowski.

A general study is made of the forms in the animal kingdom, with attention given to classification, distribution, habitats, and relation to each other and to man.

Laboratory.—The form and activities of animals are observed in the field, vivaria and the museum, and a comparative study of the systems of organs in a few selected types is made.

114. EMBRYOLOGY VET. Freshman year, second semester. Class work, one hour; laboratory, three hours. Two semester credits. Given concurrently with Vet. Med. 202 and 214. Prerequisite: Zoölogy 111, and Vet. Med. 201 and 213. Professor Ackert and Doctor Muttkowski.

The origin of the germ cells, fertilization, the establishment of relations between the uterus and embryo, the development of membranes, and the nutrition of the foetus in mammals are considered briefly.

Laboratory.—Exercises in the reconstruction of organs and systems from sections and dissections in the chick and pig embryos, and of foetal relations in mammals.

117. EMBRYOLOGY. Junior and elective, first and second semesters. Class work, two hours; laboratory, three hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105. Professor Nabours, Professor Ackert, and Doctor Muttkowski.

The development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth in mammals are studied in this course.

Laboratory.—Studies of the male and female germ cells, stages in the processes of fertilization, the segmenting ovum, and whole amounts, serial sections, and reconstruction of the chick and pig embryos in several stages of growth, with demonstrations of types of mammalian foetal relations form the subject matter of the laboratory investigation.

123. PARASITOLOGY. Senior year and elective, first semester. Class work, one hour; laboratory, three hours. Two semester credits. Prerequisite: Courses 101 and 102, or 105. Professor Ackert.

A study is made of the biology, life histories, and economic importance of the external and internal parasites of the domestic animals and man.

Laboratory.—The structural and functional adaptations of selected types of parasites are studied in the laboratory.

126. ECONOMIC ZOÖLOGY. Elective, second semester. Class work, one hour; laboratory, six hours. Three semester credits. Professor Ackert.

The bird and mammal groups are studied comprehensively. Specimens in the museum are used extensively.

Laboratory.—The laboratory work comprises largely three-hour field trips to a number of selected areas: woods, streams, meadows, College campus, and farm. This work includes identification of birds and mammals, with special studies of their migration, adaptation, and economic importance.

129. ZOÖLOGICAL PROBLEMS. Elective, both semesters. One or two semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Doctor Muttkowski.

Individual problems in heredity, parasitology, cytology, embryology, and animal behavior are assigned by the instructors in charge.

FOR GRADUATES AND UNDERGRADUATES

201. ADVANCED INVERTEBRATE ZOÖLOGY. Elective, first semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoölogy 101 and 102, or 105. Professor Ackert.

A comprehensive study is made of representatives of the invertebrates, from the standpoints of behavior, comparative anatomy, development, and phylogeny. Representatives of the invertebrate groups are studied from the morphological aspect.

202. ADVANCED VERTEBRATE ZOÖLOGY. Elective, second semester. Class work, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoölogy 101 and 102, or 105. Professor Ackert.

The behavior, comparative anatomy, development, and phylogeny are studied, giving a comprehensive view of the chordates. A study is made of the anatomy and morphology of certain representative vertebrates.

205. TAXONOMY OF INVERTEBRATES. Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105; and Entomology 216, concurrently. Doctor Muttkowski.

Practice is had in the use of keys for the identification of species, and emphasis is placed on familiarity with the literature of invertebrate taxonomy, except insects, and on the identification of species in the local fauna.

208. TAXONOMY OF VERTEBRATES. Elective, first or second semester. Laboratory, nine hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105; and Entomology 216, concurrently. Doctor Muttkowski.

This course is similar to course 205, with the difference that vertebrates instead of invertebrates are studied.

211. ANIMAL ECOLOGY. Elective, second semester. Lectures, one hour; laboratory and field work, six hours. Three semester credits. Prerequisites: Zoölogy 101 and 102, or 105, and Entomology 101. Doctor Muttkowski.

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is con-

sidered from the descriptive, comparative and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The fundamental principles and other general aspects of the science are presented in the form of lectures.

214. **CYTOLOGY.** Elective, first semester. Lecture, two hours; laboratory, six hours. Four semester credits. Prerequisite: Zoölogy 108, 117, or equivalent. Associate Professor Harman.

Methods of preparing material for microscopical study; killing, fixing, staining, and sectioning; the development of the germ cells; and theories of structure and functions of the different parts of the cell are matters considered in this course. The work forms a basis for studies of heredity and related subjects.

217. **EVOLUTION AND HEREDITY.** Elective, second semester. Lecture, two hours; library reference reading and reports, three or six hours. Three or four semester credits. Prerequisites: Consult instructor. Professor Nabours.

A lecture and reading course dealing with the development of the idea of evolution; the evidence and the principal theories of the causes; problems of variation, heredity, and experimental evolution.

220. **ADVANCED MAMMALIAN EMBRYOLOGY.** Elective, second semester. Lectures, two hours; laboratory, six hours. Four semester credits. Prerequisites: Zoölogy 108, 114 or 117, or the equivalent. Professor Nabours and Associate Professor Harman.

The course consists of further study of the main facts of embryology, with special reference to their bearing upon biological theories, the consideration of embryological problems, and a comparative study of the physiology of reproduction in mammals, including man.

225. **ZOÖLOGICAL AND ENTOMOLOGICAL SEMINAR.** Elective, both semesters. One two-hour session a week. One credit. Subject matter changes each semester. Prerequisite: Consult seminar committee.

This course consists in the presentation of original investigations, reviews of papers appearing in current journals, summaries of recent advances in the various fields, and discussions of the various aspects of the fundamental problems of modern biology.

FOR GRADUATES

301. **RESEARCH IN ZOÖLOGY.** Elective, both semesters and during the summer. One to five semester credits. Prerequisites: Consult instructors. Professor Nabours, Professor Ackert, Associate Professor Harman, and Doctor Muttkowski.

Individual research problems in heredity and experimental evolution, parasitology, cytology, embryology, and animal behavior are assigned.

Special Courses for Teachers

At the present time teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science and domestic art, and many others are extending the work hitherto given. The State law requiring the teaching of agriculture in the rural schools is also creating a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Nos. 31, 32, 33, 35, 36 and 37, on pages 205 to 206, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the semester in which a subject is regularly given.

The conditions and requirements for the different classes of state certificates are stated in the introductory paragraphs for the Department of Education, page 233.

The course for persons who wish to prepare for teaching vocational agriculture under the Smith-Hughes law is outlined under the Division of Agriculture, page 90, and the course for those wishing to qualify as teachers of vocational home economics, under the same law, is given on page 187, under the Division of Home Economics.

The Summer School

June 6 to August 8, 1919

HARRY LEWELLYN KENT, *Acting Dean*

PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts, and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer months, the Board of Administration has authorized the organization of a Summer School. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, mathematics, the sciences, and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demand placed upon the public schools, viz.: Preparing boys and girls for vocational and social efficiency.

ADVANTAGES AT KANSAS STATE AGRICULTURAL COLLEGE

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized, and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 1,137 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone ob-

tained from the College quarries. The College owns and operates its own system of waterworks, and is provided with a complete sewerage system.

The library is open during the summer and its valuable collection of books, periodicals, bulletins, and reports is placed at the service of the Summer School students.

EXPENSES

Tuition is free. A matriculation or entrance fee of \$5 and an incidental fee of \$5 are charged all students whose homes are in Kansas. For nonresidents of the state a matriculation fee of \$10 and an incidental fee of \$10 are charged. Each student pays also a sick-benefit fee of \$1. Receipts for these fees must be presented before enrollment in the Summer School classes. Table board varies from \$5 to \$7 a week. Three meals a day, except on Sunday, are served at the College cafeteria in Kedzie Hall. Room rent ranges from \$8 to \$14 per month. The College Young Men's Christian Association offers accommodation in its building for a limited number of men students at prices ranging from \$10 to \$12 a month. The cost of rooms is reduced by half where two students room together.

REGISTRATION AND LATE REGISTRATION

Registration will take place in Nichols Gymnasium from eight until five o'clock on the opening day, Friday, June 6. No one will be allowed to register for full-time work after Friday, June 20. All class and laboratory work begins with the first period, Saturday, June 7.

The opening day in 1920 will be May 28.

COLLEGE CREDITS AND VISITING PRIVILEGES

Full College credit will be given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of courses. Students desiring College credit will not be allowed to carry more than nine semester credit hours of work, except upon written approval of the proper dean. Those interested primarily in freshening their acquaintance with subject matter, in enlarging their outlook, or in improving their methods of teaching, and not caring for credit toward a degree, may, upon showing a receipt for Summer School fees, be given a visitor's card, which will admit them to any courses offered. They should, however, make out class cards for any courses which they wish seriously to pursue. A limited visiting privilege may be granted to candidates for College credit by the Director in case such privilege be not likely to interfere with the quality of the College-credit work.

CONVOCATION AND COLLEGE LECTURES

From time to time, as announced, classes will be displaced for an hour for special lectures, musical, or literary exercises. During the Summer Session lecturers of note, specialists in their particular fields, will lecture before the Summer School.

At other times the program will be musical or literary in nature. These numbers are furnished by the Summer School music staff, by visiting artists, and by members of the Summer School chorus and orchestra. Every student with musical ability is urged to join one of the musical organizations.

RECREATION AND AMUSEMENT

A part of the attraction of the Summer School session is the opportunity for recreation and social environment. The vicinity of Manhattan is rich in features of interest for "hikes." Usually lunch is carried and supper eaten on these trips. The agronomy or experimental farm is visited on one of these trips; the serum plant and livestock barns are visited on another. Other hikes are made to places of natural interest. Camp Funston is only forty minutes distant by trolley, and a trip to the camp makes an enjoyable and instructive outing.

There are picture shows on the campus; parties, "community" sings, and folk games are held. There is a play time when all members of the Summer School may spend an hour in real play. Baseball, hockey, tennis, swimming and other sports are carried on.

For those who appreciate opportunities for literary and forensic improvement, combined with social good times, the Summer School Literary Society meets Saturday evening of each week and is open to all students.

SPECIAL FEATURES

LUNCH-ROOM MANAGEMENT. Many teachers of home economics have not had training for lunch-room management work and are being called upon to conduct lunch rooms or cafeterias in the high schools in which they teach. Other persons with home economics training are planning to turn to commercial lunch-room cafeteria management as a profession. In order that persons may prepare for such work in the shortest possible time an intensive course in lunch-room management is offered in the Summer School.

Those who take this course must give full time to the work. The course is open only to those who are physically fit and have had the proper prerequisite training. Admission to the course should be arranged for before Summer School opens by writing to Dean Helen B. Thompson, Kansas State Agricultural College, Manhattan, Kan. For full details of the course see page 309.

VOCATIONAL AGRICULTURE. Owing to the very great demand for persons properly qualified to teach vocational agriculture in schools benefiting from state and federal funds, special emphasis has been given to courses for such teachers. An Institute for Teachers of Vocational Agriculture will be held during the first two weeks of the Summer School. Prof. George A. Works, of Cornell University, will lecture and conduct round tables the first week. Mr. L. S. Hawkins, chief of the Division of Vocational Education of the Federal Board, Washington, D. C., will lecture for one or two days. Mr. C. V. Williams, special agent for agriculture for the Federal Board for Vocational Education, will also assist at the institute.

All teachers of vocational agriculture will be present and participate in the discussions. Those who are planning to qualify for teaching vocational agriculture will attend the meetings and get a most helpful idea of the method of conducting the work.

The following special courses are given for these teachers: Agricultural Education, a course dealing with the organization and adminis-

tration of work in vocational agriculture; Special Methods in Teaching Agriculture; Farm Shop Work, a course in blacksmithing, soldering, babbitting, belt lacing, etc., planned especially for teachers of agriculture; Farm Animals in Health and Disease, a practical course for teachers, offered by the Department of Veterinary Medicine; and a Teachers' Course in Animal Husbandry.

For still other courses, see the announcements of the various departments in the Division of Agriculture, pp. 87, *et seq.*

TEACHERS OF NORMAL TRAINING AGRICULTURE. The State Board of Education at a recent meeting ruled that all persons who had college credit in chemistry and zoölogy, and either college or high-school credit in botany, and who spent their entire time taking agriculture during the present Summer Session and earned at least eight hours of credit in agriculture, would be approved for teaching agriculture for normal-training classes. The courses offered in this Summer School are admirably adapted for such preparation. This is an exceptional opportunity for the teacher with science training to qualify for the teaching of normal-training agriculture.

SPECIAL SHORT COURSES. In order that there may be no loss of time on the part of persons who wish to take special courses in automechanics, traction engines, carpentry, foundry, blacksmithing and machine shop work, the short courses in those subjects will be offered during the Summer Session. For description of courses, fees, etc., see pp. 306 and 307.

Courses in the Summer School

Division of Agriculture*

F. D. FARRELL, Dean

AGRONOMY

Professor THROCKMORTON
Assistant Professor SEWELL
Assistant Professor ZAHNLEY
Assistant Professor MULLEN

102. FORAGE CROP PRODUCTION. Class work, four hours; laboratory, six hours. Three semester credits. Prerequisite: Botany 101. Assistant Professor Mullen.

This course is a study of the distribution, relative importance, value, and production of forage crops, including sorghums, alfalfa, clover, and the grasses.

120. TEACHERS' COURSE IN SOILS AND CROPS. Class work, four hours; laboratory, six hours. Three semester credits. Professor Throckmorton and Assistant Professor Mullen.

This course is designed primarily for young women preparing to teach the one-year course in agriculture offered in many Kansas high schools. The course deals with the origin and formation, texture and composition, of soils; the management of soils to conserve moisture and to maintain fertility; and the adaptation of soils to crops. It also deals with the distribution, relative importance, and production of such grain crops as wheat, corn, kafir, oats, barley, and rye; and such forage crops as sorghum, alfalfa, clover and grasses.

121. ELEMENTARY AGRICULTURE. Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Zahnley.

This is a general course planned for teachers of public schools who teach one year of agriculture. It covers the entire field of general agriculture, together with suggested outlines for a year's work in the laboratory. Texts: Waters' *Essentials of Agriculture*, and Call and Shafer's *Manual of Agriculture*.

131. SOILS. Class work, six hours; laboratory, six hours. Four semester credits. Assistant Professor Sewell.

This course comprises a study of the management of farm soils and deals with the origin of soils and their physical nature; the effect of different methods of cultivation upon the liberation of plant food; conservation of moisture, and physical conditions of the soil. Prerequisite: General Chemistry. Text: Lyon, Fippin, and Buckman's *Principles of Soil Management*.

132. SOIL FERTILITY. Class work, four hours; laboratory, six hours. Three semester credits. Prerequisite: Soils, and Chemistry 150. Professor Throckmorton.

Factors influencing the fertility of the soil, the effect of different systems of farming on soil fertility, and management of the soil to conserve its fertility receive the most attention in this course.

* For methods of Teaching Agriculture, and Agriculture Education, see Department of Education, page 233.

ANIMAL HUSBANDRY

Professor McCAMPBELL
Associate Professor BELL
Associate Professor FERRIN
Assistant Professor PATERSON

101. TYPES AND CLASSES OF LIVESTOCK. Class work, two hours; laboratory, twelve hours. Three semester credits. Associate Professor Bell and Assistant Professor Paterson.

This course consists of a study of the market and breeding types and classes of horses, cattle, sheep, and swine. Text: Vaughn's *Types and Market Classes*.

Laboratory—Practice is given in scoring and judging market and breeding animals.

104. PRINCIPLES OF FEEDING. Class work, six hours. Three semester credits. Prerequisite: Elementary Organic Chemistry. Associate Professor Ferrin.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of the practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

128. TEACHERS' COURSE IN ANIMAL HUSBANDRY. Class work, six hours; laboratory, six hours. Four semester credits. Professor McCampbell and Assistant Professor Paterson.

This course is planned especially to meet the needs of teachers who desire a general rather than a special course in animal husbandry. The work in the classroom embraces the following:

a. Feeding principles and practices, three weeks. Text: Henry and Morrison's *Feeds and Feeding*.

b. History of breeds and pedigrees, two weeks. Text: Plumb's *Types and Breeds of Livestock*.

c. Breeding principles and practices, two weeks. Text: Munford's *Breeding Farm Animals*.

d. Housing, barns, sanitation, herd and flock management, fitting for shows, sale management, etc., two weeks. Lectures.

Laboratory.—The first seven weeks are devoted to judging; the last two weeks are given over to meat demonstrations.

DAIRY HUSBANDRY

Professor FITCH
Assistant Professor CAVE

101. ELEMENTS OF DAIRYING. Class work, four hours; laboratory, six hours. Three semester credits. Professor Fitch and Assistant Professor Cave.

This is a general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming, construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and buttermaking on the farm. Lectures are supplemented by textbook work.

Laboratory.—Practice in operating the Babcock test and lactometer; separation of milk; and farm buttermaking.

104. DAIRY JUDGING. Laboratory, six hours. One semester credit. Assistant Professor Cave.

Dairy stock is judged from the standpoint of economical production and breed type. Score cards are used to teach the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes.

120. **TEACHERS' COURSE IN DAIRY HUSBANDRY.** Class and laboratory, four hours. One semester credit. Professor Fitch.

This is a general course in dairying for high-school teachers, and consists of lectures and recitations, class demonstrations, and laboratory work. The four leading breeds of dairy cattle are studied and some practice provided in judging. The general problems involved in the feeding and management of dairy cattle for milk production are discussed. The composition of milk and dairy products, butter and cheese making, separation and testing of milk, and the care of milk and cream are considered as fully as time will permit. Practice is also provided in the use of the separator, the Babcock test, and butter and cheese making.

HORTICULTURE

Professor DICKENS
Professor AHEARN

101. **PLANT PROPAGATION.** Class work, four hours; laboratory, six hours. Three semester credits. Prerequisite: Plant Anatomy. Professor Dickens.

A discussion of the natural and cultural methods of propagation; seeds, seed testing and seed growing; treatment given to different classes of seeds; the production of seedlings for stock, grafting, budding, layering, making cuttings, and the special requirements necessary in propagating commercial fruits and ornamental plants. Lectures and assigned readings.

Laboratory.—Practical work is given in preparation of seeds, seed testing, the preparation of seed beds, the use of seeding machinery, transplanting, grafting, budding, and general nursery practice.

204. **ORCHARD MANAGEMENT.** Class work, six hours; laboratory, six hours. Four semester credits. Professor Dickens.

The class work includes studies of the following factors that are of vital importance to fruit growers: Location, soil improvement, cultural methods, pruning, capital and equipment for handling orchards, and crop disposition.

Laboratory.—This course offers practice in establishing young orchards, spraying (orchard work), pollination studies, thinning of fruit, summer pruning and problems in orchard management.

210. **MARKET GARDENING.** Class work, four hours; laboratory, six hours. Three semester credits. Professor Ahearn.

In this course a systematic study is made of both commercial and amateur gardening; soil improvement, the value of fertilizer, marketing and storage conditions are given special attention.

Laboratory.—The laboratory work consists of the preparation of the plans for gardens; seed testing; the construction of the hotbed; the use of tools and machinery; and practical work in the garden.

213. **GARDENING.** Class work, six hours. Three semester credits. Professor Ahearn.

It is the purpose of this course in gardening to give young women a working knowledge of and a close acquaintance with the garden as it concerns the home. The first part of the course is concerned with the principles of plant growth, relation of soils to plants and the methods necessary for successful work in kitchen gardening, flower beds, window gardening, the requirements of plants in regard to watering, temperatures, hotbeds and the first principles of floriculture.

In the latter part of the course the young women are introduced to the principles of landscape gardening, with particular reference to the problems of home plantings. In conjunction with the lectures, each

member of the class is required to prepare plans for town home, farm home and country place, and the classes are required to do group work that will give them an insight into the needs of school grounds. Play grounds, public parks and cemeteries are considered and are given a considerable amount of time.

Particular emphasis is laid upon the acquaintance with materials that are used for garden purposes. The College campus, gardens and green-houses furnish a wealth of material that is best adapted to garden problems and landscape composition.

217. LANDSCAPE GARDENING. Class work, four hours; laboratory, six hours. Three semester credits. Professor Ahearn.

Lectures are given on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country homes, school grounds, and public parks. Opportunity is given the student to become better acquainted with plant materials that are best adapted to Kansas conditions.

POULTRY HUSBANDRY

Professor LIPPINCOTT
Instructor FOX

101. FARM POULTRY PRODUCTION. Class work, two hours; laboratory, six hours. Two semester credits. Professor Lippincott.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, and preparing for market are studied.

105. PRACTICE IN INCUBATION. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One to two semester credits. Mr. Fox.

This course consists of the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation and varying temperature, moisture and ventilation conditions are kept. For one credit, one successful hatch must be brought off in either a hot-air or hot-water incubator. For further credit, the other types must be operated. Students specializing in poultry husbandry must take three credits.

107. PRACTICE IN BROODING. Three times a day, seven days a week, for a period of not less than four weeks, at hours outside the regular schedule. One to three semester credits. Mr. Fox.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the four most critical weeks. A report of fuel and feed, of gain in weight, and of mortality, is required. This course must be preceded or accompanied by Practice in Incubation. For one credit a group of at least fifty baby chicks must be successfully brooded for four weeks in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types of brooders. Students specializing in poultry husbandry must take three credits.

110. POULTRY BREEDS AND TYPES. Class work, two hours; laboratory, six hours. Two semester credits. Assistant Fox.

In this course a historical study is made of the various breeds commonly found on a Kansas farm. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties, both by score cards and by comparison.

120. TEACHERS' COURSE IN POULTRY HUSBANDRY. Class work, two hours. One semester credit. Professor Lippincott.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubation, brooding, and preparing poultry for market are studied.

201. MARKET POULTRY. Class work, two hours; laboratory, six to twelve hours. Two to three semester credits. Mr. Fox.

In this course the lectures cover the methods of handling market poultry alive and dressed. The laboratory work consists of practice work in caponizing, killing, bleeding, packing, cooling, grading poultry for market, and candling and grading eggs. Where twelve hours of laboratory is taken the student will also milkfeed three lots of chickens for a period of two weeks each.

VETERINARY MEDICINE

Professor DYKSTRA
Associate Professor BURT

167. FARM ANIMALS IN HEALTH AND DISEASE. Class work, six hours. Three semester credits. Professor Dykstra.

In this course the common diseases of domesticated animals are discussed, and particular attention is devoted to first-aid treatment, preventive measures against the spread of contagious and infectious diseases, methods of taking temperatures, counting the pulse and respirations, modes of administering drugs, bandaging, etc. Various aids to correct diagnoses, particularly tuberculin testing of dairy and beef animals, are taken up. A few lectures on the more commonly used medicines are included. When clinical cases are available, they are used to visualize the instruction given in the class room. This is a course for teachers and students preparing to teach vocational agriculture.

213. PHYSIOLOGY. Class work, six hours. Three semester credits. Associate Professor Burt.

The work in this subject consists of the study of the skeletal tissues, the circulatory, digestive, respiratory and other systems, in much the same manner as is done during the regular college course. The lectures are supplemented with demonstrations and experiments. Dissected specimens are used as often as possible instead of papier-mâché models. The laboratory is well equipped with physiological apparatus. This apparatus is freely employed and its application explained. The demonstrations and experiments are especially helpful to those engaged in teaching and those intending to teach this subject. Credit in this course is the same as the credit in Human Physiology. It may be substituted for Animal Physiology. Text: Martin's *Human Body*. References are also made to Howell's *Text Book on Human Physiology* and others. Teachers are recommended to use the text by Howell.

Division of Engineering

A. A. POTTER, Dean
Professor SEATON

APPLIED MECHANICS AND MECHANICAL DRAWING

98, 99. MECHANICAL DRAWING FOR HIGH SCHOOLS. Lectures and recitations, two hours; drafting, eight hours. Three semester credits in the School of Agriculture.

A course intended for high-school teachers of mechanical drawing and for those desiring to make College entrance credits. The work of the course will be varied to suit the previous training of those who register for it. A study is made of drawing instruments and materials, drawing-room practice and conventions, lettering, orthographic projection, and simple working drawings. Practice is also given in tracing and blue-printing. Text: Crawshaw and Phillip's *Mechanical Drawing for Secondary Schools*.

101. APPLIED MECHANICS I RECITATION. Class work, six hours. Three semester credits. Prerequisites: Calculus I, and Engineering Physics II.

This course includes composition, resolution and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motion; work, energy and power; graphical solutions of problems in statics. Text: Riggs' Hancock's *Applied Mechanics for Engineers*.

110. APPLIED MECHANICS II RECITATION. Class work, ten hours. Five semester credits. Prerequisite: Applied Mechanics I.

This course discusses the behavior of materials subjected to tension, compression and shear; riveted joints; torsion, shafts, and the transmission of power; strength and stiffness of simple and continuous beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, steel and reinforced concrete; design of built-up beams and box girders; resilience of beams, stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Texts: Boyd's *Strength of Materials* and Hool's *Reinforced Concrete Construction*, Vol. I. *Cambria Steel* is used for reference.

115. APPLIED MECHANICS E-II RECITATION. Class work, six hours. Three semester credits. Prerequisite: Applied Mechanics I.

Behavior of materials subjected to tension, compression and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of simple beams; design of beams of wood, steel and reinforced concrete; stresses in columns and hooks; and the design of columns of wood, steel and reinforced concrete. Text: Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

160, 165. MECHANICAL DRAWING I. Drafting, twelve hours. Two semester credits. Prerequisite: Descriptive Geometry (Ap. Mech. 158).

The course includes the use and care of drawing instruments, with simple exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance, and to the subject matter and layout of titles and notes. The following supplies are required: Triangles, T-Square, scale, pencils, pens, ink, eraser, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these until after consulting with the instructor. Text: French's *Engineering Drawing*.

170. MECHANICAL DRAWING II. Drafting, eighteen hours. Three semester credits.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. This is followed by the design of cams, gears and quick returns to fulfill specified conditions. Center-line drawings are first made, embodying the solution of the problems, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Velocity diagrams are drawn for the cams and quick returns. Gear teeth are accurately rolled and are drawn from templates prepared by the student. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to the dimensioning of the drawings. Text: French's *Engineering Drawing*.

180. KINEMATICS. Lectures and recitations, six hours. Three semester credits. Prerequisites, if taken for credit: Plane Trigonometry, Descriptive Geometry. Persons not taking the work for credit may be assigned to it without these prerequisites, by permission from the head of the Department.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cord and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; wheels in trains; curves for gear teeth. The solution of a large number of graphical and mathematical problems is required in this course. Text: Schwamb and Merrill's *Elements of Mechanism*.

FARM ENGINEERING

Assistant Professor SANDERS

116, 117. TRACTORS AND TRUCKS. Lectures and recitations, four hours; laboratory practice, six hours. Three semester credits.

A study is made of the selection, care, and repair of traction engines.

125. FARM MOTORS I. Lectures and recitations, four hours; laboratory practice, six hours. Three semester credits.

This course is designed to teach the operation, care, and repair of stationary gas engines, oil engines, and steam engines. Some time is also devoted to automobile details, including automobile motors, carburetors, transmission systems, differentials, clutches, and starting systems.

MANUAL TRAINING AND SHOP PRACTICE

Instructor LYNCH
Instructor JONES
Instructor GRANT
Instructor PARKER
Instructor BUNDY

Assistant GRANELL
Assistant BALDWIN
Assistant STROM
Assistant _____

105. WOODWORK I. Laboratory, six hours. One semester credit. Mr. Grant.

This is a beginning course designed to give practice with the wood-working bench tools on the various woods, and to teach the proper methods of finishing woods with stains, varnish, paint, etc. Considerable emphasis is placed upon the proper use and care of tools.

119. MANUAL TRAINING FOR PRIMARY GRADES. Laboratory, twelve hours. Two semester credits. Mr. Parker.

The work of this course is planned to meet the need of teachers of primary work. Exercises suitable for the pupils of the various grades

are made by the class and a brief study is made of suitable materials and equipment. The work includes paper folding and cutting, cardboard construction, raffia, cord work, weaving, reed work, and elementary tool work in woodworking.

120. WOODWORKING FOR GRAMMAR GRADES. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. ———.

This is a course in elementary woodworking planned primarily for the teacher of the upper grades. The work consists of simple, useful problems which bring into use the common woodworking tools. Various woods are used so as to acquaint the student with different kinds of lumber. The finishing consists of staining, filling, and waxing. Considerable emphasis is laid upon the use and care of tools.

125. WOODWORKING I FOR HIGH SCHOOLS. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. ———.

This is a continuation of grade woodwork, the work being of such a nature as to require previous experience with tools. The early part of the course consists of useful problems in elementary furniture construction, a brief study of common woods and methods of finishing them, including staining, filling, waxing, varnishing and rubbing. During the latter part of the course the various woodworking machines are discussed, demonstrated, and instructions given in using them, after which enough work is given to enable the student to operate the woodworking machines.

130. WOODWORKING II FOR HIGH SCHOOLS. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. ———.

This is a course in advanced cabinet construction, with the use of woodworking machinery and such bench work as is necessary for the assembling and finishing of the problems being constructed. A study is made of the progressive steps or operations in order that a proper use may be made of time. Instruction is given in the use and care of woodworking machinery and in staining, filling, varnishing, rubbing and finishing the problems constructed.

135. WOODTURNING. Laboratory, twelve hours. Two semester credits. Mr. Parker and Mr. ———.

This course is designed to prepare teachers for teaching wood turning in high schools. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave surfaces, after which articles are made from drawings which have a practical application in a student's home or social life, such as handles, mallets, rolling pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the student make some object of value from his own design, both as a project in turning and as a practical lesson in designing.

141. FARM SHOP PRACTICE. Laboratory, eighteen hours. Three semester credits. Mr. Jones and Mr. Lynch.

This course is designed for those who wish to prepare themselves for teaching in accordance with the Smith-Hughes Act. The course consists of blacksmithing closely related to farm work, babbitting, soldering, belt lacing, thread cutting with hand dies and taps, drilling and drill grinding.

146. FARM WOODWORK. Laboratory, eighteen hours. Three semester credits. Mr. Parker and Mr. ———.

This practical course is designed for the training of teachers to handle problems in connection with carpenter work on the farm. It consists of rafter cutting and erection, studding and siding work, making

window and door frames, hanging doors, and similar operations on full-size construction work. Bills of material are made in all cases before each exercise is started. Exercises are given in saw filing, tool sharpening, and the general care and upkeep of tools.

150. **FORGING I.** Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

In this course the field of hand-forging as related to high-school work is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable the worker to forge, harden and temper many of the tools which are needed in this and other branches of manual training.

Tools required: One pair five-inch outside calipers, one two-foot rule, one ball-peen hammer, weight about two pounds, including handle.

155. **FORGING II.** Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

Advance work is given in the forging of iron and in the manufacture of tools, such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel and in the casehardening of mild steel.

Tools required: Same as in Forging I.

160. **FOUNDRY PRACTICE.** Laboratory, six hours. One semester credit. Mr. Grant.

Practice is given in floor, bench, and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

170. **MACHINE TOOL WORK I.** Laboratory, twelve hours. Two semester credits. Mr. Jones and Mr. Bundy.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and knurling on the lathe. Practically all of the work is upon parts of machines that are being built in the shops.

Tools required: A four-inch scale, or B. & S. slide caliper rule, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, one B. & S. center gage.

215. **FORGING III.** Laboratory, six hours. One semester credit. Mr. Lynch and Mr. Granell.

Special work is given in the forging of iron and steel to impart skill in the different operations. Some practice is given in the making of ornamental iron work. Tools required: Same as for course 150.

225. **MACHINE TOOL WORK II.** Laboratory, six hours. One semester credit. Mr. Jones and Mr. Bundy.

This course consists of progressive problems in turning and caliper-ing, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine.

Tools required: Same as in Machine Tool Work I.

230. **MACHINE TOOL WORK III.** Laboratory, six hours. One semester credit. Mr. Jones and Mr. Bundy.

This course takes up work on the turret lathe and boring mill; lacings, and methods of belt connections, compound and differential indexing, and the cutting of spiral gears on the milling machine.

Tools required: Same as in Machine Tool Work I.

SPECIAL COURSES**IN AUTOMOBILES, TRACTION ENGINES, CARPENTRY, FOUNDRY, BLACKSMITHING, AND MACHINE SHOP WORK**

To meet the need of those who wish to gain practical knowledge of the trades related to engineering, the courses described below will be offered beginning June 7 and continuing to the end of the Summer Session. A student pursuing one of these courses will have to devote about 40 hours a week to actual work in the shop and laboratory, and will be expected to pay the following laboratory fees: Automobile mechanics, \$10 a month; tractor operators, \$12 a month; blacksmiths, \$12 a month; machinists, \$10 a month; carpenters, \$5 a month; and foundrymen, \$5 a month. Besides these laboratory fees, an incidental fee of \$3 will be charged for entrance, as will be a sick benefit fee of 50 cents, which entitles the student to free medical attention from the College physician.

AUTOMOBILES. The course in automobiles includes a thorough study of the construction and assembly of four-, six-, and eight-cylinder engines; the operation, testing and adjustment of these engines; electric ignition, starting and lighting systems; the automobile chassis, including transmission systems and differentials; tire repairs; general repairing, overhauling and operation of automobiles; and sufficient shopwork to enable the student to make essential repairs.

Extensive equipment is available, including many types of cars and engines, machine tool tire-repair equipment, and electrical equipment. All grades of work will be given; the garage mechanic may supplement his knowledge with advanced and specialized work; or the amateur may begin at the bottom and obtain a comprehensive knowledge of the whole field.

TRACTION ENGINES. The tractor course covers thoroughly the construction, operation, and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including traction hitches; shop work.

About 20 tractors and 35 stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is suited to the needs of the individual student. The entire machine shop of the College is available for this course, which includes a thorough training in the manipulation of lathes, planers, drill presses, boring mills, shapers, and screw machines.

In order to enable the student to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns, experience with different kinds of sands and facings; open sand work, sweep molding, machine molding, core making; setting of cores, gates and risers; different methods of venting; also general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, punching, care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers, hammers; hardening, tempering, annealing, case and pack hardening, tool forging, oxyacetylene and thermit processes of welding.

A student entering any branch will devote his entire attention to the work in which he is most interested or for which he is best prepared. He will be given practical instruction by efficient teachers, completely mastering each step before proceeding to the next. He will work with the machines themselves, studying the construction, operation and adjustment of every part until he thoroughly understands it. The courses are so arranged that the student will have much individual attention from the instructor, though the development of initiative will not be neglected.

Division of Home Economics

HELEN B. THOMPSON, Dean

APPLIED ART

Professor HOLMAN

101. **DESIGN.** Class work, three hours; studio work, nine hours. Three semester credits. Professor Holman.

A study is made of the principles which control the use of color and the selection and arrangement of elements in the production of objects themselves and in their uses as parts of a whole. Many exercises are given in which clothing and home furnishings are scored as to design. A natural motif is adapted to material, function, and form.

102. **PUBLIC SCHOOL DRAWING.** Class work, two hours; studio work, six hours. Two semester credits. Professor Holman.

This course presents representation, color, design, construction work, and picture study for rural and grade schools.

CLOTHING AND TEXTILES

Instructor FECHT
Assistant GORBY

101. **CLOTHING I.** Class work, two hours; laboratory, six hours. Two semester credits. Miss Gorbý.

This course is especially recommended to those students who are expecting to teach clothing. The teaching of the historical development of costume includes a survey of the ancient Egyptian, Grecian, and Roman costumes, and of early modern French costumes. The aim of the course is to give the student information regarding these different periods. The adaptation of these costumes to present fashions is discussed.

Laboratory.—In the laboratory problems dealing with garment construction are dealt with, the nature of the problem being dependent upon the preparation of the student.

116. **TEXTILES.** Class work, four hours; laboratory, six hours. Three semester credits. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the historical and economic development of the textile industry from primitive ages to the present time. The combination of art, science, and mechanics that makes possible the elaborateness of modern textiles is given careful attention.

Laboratory.—The behavior of textile fibers toward various chemical reagents is studied. Physical and microscopic tests are made for the

identification of fibers. Bleaching and dyeing; laundry processes as they affect color, shrinkage, strength, etc.; and analysis of mixed goods are likewise considered in the laboratory work.

206. CLOTHING III. Laboratory, twelve hours. Two semester credits. Prerequisite: Clothing I, or its equivalent. Miss Fecht.

This course emphasizes the artistic in lines and decoration, deals with the design and adaptation of materials for individual and occasion, and lays stress on self-expression through dress. Commercial patterns are used. Practice in cutting, fitting, and different finishes is presented. Students are also requested to bring garments for remodeling. In this way materials which are usually discarded may be utilized, thus promoting economy and thrift.

211. MILLINERY. Class work, two hours; laboratory, six hours. Two semester credits. Miss Gorby.

This course includes a discussion of practical and artistic principles of millinery. Attention is given to taste and economy in the selection of hats. Renovation and the use of old materials is considered.

FOOD ECONOMICS AND NUTRITION

Assistant Professor ROTHERMEL
Instructor PETERS

101. FOODS I. Class work, two hours; laboratory, twelve hours. Three semester credits. Prerequisites: Entrance credit in Physics, and Chemistry I.

The application of heat to various food principles is the basis of study in this course. The economic uses of the various foodstuffs is emphasized, as is also the study of commercially prepared food products.

Laboratory.—Experimental and practical cookery illustrating this course forms the basis of the laboratory work.

201. DIETETICS. Class work, six hours; laboratory, twelve hours. Five semester credits. Prerequisites: Foods II, and Human Nutrition. Assistant Professor Rothermel.

This course deals with the application of the principles of human nutrition to the practical feeding problems of the individual and the group. The following topics receive attention: daily food requirements in health and disease throughout infancy, childhood, adolescence, adult life, and old age; typical dietaries for each period of life; the problem of satisfying the diverse requirements in families and other groups; milk formulæ; quantitative estimations of special diets for abnormal conditions of nutrition and deficiency diseases, corrective food treatment of glandular disturbances.

Laboratory.—Studies in weight, measure and cost of some of the common food materials; experiments showing digestive changes and modifications of food materials; calculations and quantitative preparation of standard portions and combinations of foods; analysis of receipts; computation and scoring of dietaries with special regard to nutritive requirements for varying physiological, economic, and social conditions; practice in dietetical clinic.

216. MARKETING AND SERVING. Laboratory, six hours. One semester credit. Prerequisites: Dietetics, and Household Management.

This course includes the planning, marketing, preparation, and serving of meals based upon dietetic and economic standards. The application of the results of motion studies and efficient kitchen planning are emphasized.

ONE-YEAR COURSE IN LUNCH-ROOM MANAGEMENT

ADAPTED FOR THE SUMMER SCHOOL.

The purposes of the course are: To enable teachers of home economics to organize lunch rooms in connection with their teaching, or to become directors of lunch rooms; and to give training to mature women with natural aptitude and experience to enable them to hold positions as lunch-room managers.

This course is intensive and demands excellent physical endurance. Those who wish to take this course should apply in writing as soon as possible to the Dean of Home Economics, stating training and experience. The Division of Home Economics reserves the right to determine whether the applicant is qualified to become a student in this course.

Schedule of Subjects Offered

<i>First three weeks:</i>	<i>Second three weeks:</i>	<i>Third three weeks:</i>
Principles of Cookery	Institutional Cookery	Institutional Cookery
Meal Planning	Cafeteria Practice	Cafeteria Practice
Sanitation and Hygiene	Lunch-room Management	Lunch-room Management
Furnishing and Decorating		
<i>Entire nine weeks:</i>		
Food Production and Marketing.		

I. PRINCIPLES OF COOKERY. Laboratory, fifteen hours during the first three weeks.

The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. This course includes both plain and fancy cookery. In the laboratory a standard system of measurement is taught, and special attention is given to training in accuracy, neatness and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.

2. FOOD PRODUCTION AND MARKETING. Class work, three hours during the entire nine weeks.

This course covers the main points in source, production and manufacture of foods. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.

3. SANITATION AND HYGIENE. Class work, three hours during the first three weeks.

This course covers the sanitary control of eating-houses and food supply, together with the personal hygiene of the worker.

4 and 5. CAFETERIA PRACTICE. Twelve hours during the last six weeks.

This course is planned that the student may become thoroughly familiar with the cafeteria. Experience is had in serving, checking and other details.

6. FURNISHING AND DECORATING. Laboratory, nine hours during the first three weeks.

Color, form and arrangement as applied to wall and floor coverings, furniture, linen, china and silver are studied.

7. INSTITUTIONAL COOKERY. Laboratory, nine hours during the last six weeks.

This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.

8. LUNCH-ROOM MANAGEMENT. Class work, three hours, during the last six weeks.

The course covers the field of organization, equipment, service and general management of lunch rooms.

9. MEAL PLANNING. Class work, three hours during first three weeks. The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

Special Lectures

A few special lectures will be given by members of the faculty of the College in Business English, Advertising, and Accounting, as these regular subjects had to be omitted from the course because of lack of time.

Division of General Science

J. T. WILLARD, Dean

BACTERIOLOGY

Professor BUSHNELL

101. GENERAL MICROBIOLOGY. Class work, four hours; laboratory, six hours. Three semester credits.

This course is designed primarily for teachers, but students in General Science, Agriculture and Architecture may obtain credit in this course by special arrangement with the head of the department.

This course consists of a general survey of the subject of bacteriology as related to agriculture, sanitation, the preparation and care of food, etc. Some attention is also given to the method of isolation, cultivation and study of microorganisms. The student becomes somewhat familiar with methods used in the bacteriological analysis of water, milk, etc.; sterilization, sources and modes of infection by pathogenic bacteria, and means of controlling their distribution.

121. HOUSEHOLD BACTERIOLOGY. Class work, six hours; laboratory, twelve hours. Five semester credits.

This course is especially arranged for students taking domestic science. The credit received in this course is equivalent to that given for the regular college course. Students wishing to take this course should consult the head of the department before entering. See general catalogue for description of work offered, course 121.

BOTANY

Instructor HAYMAKER
Instructor DALBEY

101. GENERAL BOTANY I. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Miss Dalbey.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. Laboratory outlines are furnished by the Department.

105. GENERAL BOTANY II. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Miss Dalbey.

This is a course of lectures, combined with special study of a required text and with reference reading. The principal life functions of plants, responses of plants, such as photosynthesis, digestion, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied. The anatomy of the plant, in so far as it relates to the functions concerned, will be studied in some detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. The latter part of the course is devoted to a systematic study of some of the more important plant families in which their floral structures are considered. Some time is given to the tracing out of unknown plants by means of a key.

Laboratory.—A series of typical experiments is followed out in the laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the Department.

150. ECONOMIC PLANT DISEASES (PLANT PATHOLOGY I). Class work, two hours; field, laboratory, and library work, twelve hours. Three semester credits. Mr. Haymaker.

The diseases affecting the chief economic crops of the field, orchard and garden are studied. Among these are the smuts of cereal and forage crops; the common rusts attacking wheat, oats, rye and barley; the apple blotch, apple scab, Illinois blister canker, brown rot of fruits; potato, tomato and bean diseases, together with many others. Methods for preventing losses brought about by plant diseases will receive considerable attention. This course is intended to make high-school teachers familiar with the common plant diseases which are causing a great annual loss in Kansas. Time will be devoted to collecting and identifying these diseases in the field. Methods of collecting, preserving and preparing plant diseases for exhibit purposes, especially for high-school work, will receive attention. Text: *Diseases of Economic Plants*, by Stevens and Hall.

155. FIELD BOTANY. Class work, two hours; field, laboratory, and library work, twelve hours. Three semester credits. Miss Dalbey.

The purpose of the course is to offer teachers an opportunity to become acquainted with plants in the field, their natural history, habits, distribution and relation to their environment. Excursions will be made to different localities near Manhattan, to study plants of the prairies, woods, swamps, streams, etc. Especial attention will be given to methods of collecting and preserving plants for use in high-school teaching. Part of the laboratory work will consist of determining the names of plants by means of manuals.

160. BOTANY FOR HIGH-SCHOOL TEACHERS. Class work, two hours; laboratory and library work, twelve hours. Three semester credits. Mr. Haymaker.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, but by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural-history standpoint. Most of the larger and more important groups of plants are studied from this point of view.

CHEMISTRY

Professor KING
Associate Professor BRUBAKER
Instructor KEITH
Instructor DOW

103. CHEMISTRY HE-I. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Associate Professor Brubaker.

This work begins the study of general chemistry, and is designed, with that of chemistry HE-II, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principals of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time, both in class and laboratory, special emphasis is placed upon those facts of everyday life in and about the home which possess special value to young women. Textbook: *Inorganic Chemistry for Colleges*, by Newell.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. The laboratory guide is *A Laboratory Manual for General Chemistry*, by McPherson and Henderson. It is accompanied by mimeographed material on special subjects.

104. CHEMISTRY HE-II. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry HE-I. Mr. Keith.

The work in this course for the first half of the term is a completion of the study of general chemistry begun the preceding term. The second half of the term is devoted to the study of the general principles of qualitative analysis as outlined in *An Elementary Treatise on Qualitative Analysis*, by William McPherson.

Laboratory.—In the laboratory the student studies the ordinary methods of separation and detection of the more common metals, non-metals, acids, bases and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observation and careful reasoning required in ascertaining the composition of simple substances and mixtures. The effect of the course is to broaden, strengthen and unify the students' ideas of general chemistry.

121. ORGANIC CHEMISTRY HE. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: A college course in general chemistry. Associate Professor Hughes.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteins, and other less-known substances. Compounds used for clothing, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. Text: Norris's *Organic Chemistry*.

Laboratory.—The laboratory work includes preparations and qualitative and quantitative experiments touching the more important compounds studied in the lectures and recitations. Especial emphasis is placed on the organic compounds found in fuels, foods, fabrics, disinfectants, and other materials used in and about the home. Laboratory guide, *Experiments in Descriptive Organic Chemistry*, by Alice F. Blood.

130. HUMAN NUTRITION. Lectures and recitations, six hours. Three semester credits. Prerequisite: Acceptable courses in human physiology and organic chemistry. Miss Dow.

This is a course in the chemistry of foods and nutrition, and includes, among others, the following topics: The composition of the body; the composition of foods, and methods of investigation employed in their study; the changes that the several classes of foods undergo in cooking and digestion, and the functions that they perform in nutrition; daily food requirements, and the balancing of dietetics; food economy. *Chemistry of Food and Nutrition*, by H. C. Sherman, is used as textbook, but is supplemented by lectures.

150. QUANTITATIVE ANALYSIS I. Laboratory, six hours. Two semester credits. Prerequisites: Chemistry I and II. Associate Professor Brubaker.

This course is planned to give the student a knowledge of the simpler operations in gravimetric analysis and volumetric analysis and to lay the foundation for studies in which such knowledge is required. Particular emphasis is laid on the importance of exact quantitative work and its value in investigations connected with agriculture. Textbook: *Notes on Quantitative Chemical Analysis*, by C. W. Folk.

206. PHYSICAL CHEMISTRY. Lectures and recitations, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: Chemistry II or Chemistry HE-II. Professor King.

This course is especially adapted to meet the needs of students intending to specialize in soils, as well as those students in other divisions who desire a broader knowledge of the more fundamental laws of chemistry. In this course emphasis is placed upon the study of gas laws, osmotic pressure, surface tension, solution, colloidal solutions, thermochemistry, equilibria, and electrical conductors.

Laboratory.—In the laboratory the subject matter discussed in the lectures is investigated experimentally.

265. HOUSEHOLD CHEMISTRY. Lectures and recitations, two hours; laboratory, twelve hours. Three semester credits. Associate Professor Brubaker.

This course is designed to give the women in the course in Home Economics qualitative and quantitative work in the chemistry of the materials most intimately related to their daily life. Air, water, foods, fuel, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness and defects.

ECONOMICS AND SOCIOLOGY

Professor KAMMEYER
Associate Professor MERRITT

101. ECONOMICS. Class work, six hours. Three semester credits. Professor Kammeyer.

The fundamental principles of the science are studied and discussed in their relation to current economic problems, not as mere questions of the day but as phases of still larger problems in the evolutionary progress of economic society. The course deals with the several stages of economic development through which man has passed down to and including the ideals underlying the New Industrialism. The theory and progress of social control; price fixing by authority; business cycles; the railway problem; capitalistic monopoly; economic insecurity due to unemployment, industrial accidents, sickness and old age; trade unionism; money and the mechanism of exchange; rent; interest; profits; and wages are some of the topics for study and class discussion. Instruction is by lectures in combination with assigned readings, class discussions, and reports. Text: Ely's *Outlines of Economics*.

201. SOCIOLOGY. Class work, six hours. Three semester credits. Associate Professor Merritt.

This course deals with social life in general, involving a study of social origins, activities, and organization. Such social institutions as the family, the church, the school, and the state are studied as to origin, development, organization, and aims. The processes of socialization, social forces and social control receive emphasis. Consideration is given also to social pathology; poverty, its causes and remedies; crime, its causes and prevention; and to remedial legislation and correctional agencies. The aim of the course is to help the student get his social bearings, and to find himself as a fact and factor in the complex inter-relations of human society. Assigned library readings and special written reports are required. Instruction by lectures and class discussions. Text: Hayes's *Introduction to Sociology*.

204. BUSINESS ORGANIZATION. Class work, four hours. Two semester credits. Associate Professor Merritt.

This is a study of the entrepreneurial, partnership, and corporate forms of business organization and management; the advantages and disadvantages of each form, and legislative restrictions governing the same. The selling plans, advertising methods and systems used by typical manufacturing and commercial firms, credits and collections, are made the basis of study and reports. Attention is also given to the organization and operation of markets and exchanges, cost accounting, and special systems of wage payments. Instruction by recitation and class discussions based on Briscoe's *Economics of Business*.

207. LABOR PROBLEMS. Class work, four hours. Two semester credits. Professor Kammeyer.

In this course a study is made of the history, organization, aims, and legal status of labor unions in the United States and in England. A comparative study of the various theories of wages, and of wage-payment plans. Such phenomena as strikes in their economic, moral and legal aspects, boycotts, arbitration, etc., are made subjects for study and investigation. The course also includes a study of the various plans that have been proposed and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, consumers' leagues, etc. Instruction by lectures, assigned readings, and reports. Text: Groat's *Organized Labor in America*.

210. MONEY AND BANKING. Class work, four hours. Two semester credits. Professor Kammeyer.

The first half of this course is devoted to a study of the nature, history, and functions of money; its place as a factor in man's economic progress and its importance as such in his business activities as organized to-day; money standards and systems, monometallism, bimetalism, limping standard, paper standard, gold exchange standard; coinage and coinage laws, instruments of credit, bills of exchange, drafts; clearing houses. The second half of the course takes up the subject of banking. Banking in its historic forms is briefly considered as a preparation for a more detailed study of the federal reserve system, the federal farm loan system, and the state banks, particularly Kansas state banks. To this is added a study of savings banks, trust companies, building and loan associations and other institutionalized forms of credit. Instruction by lectures and reports. Any acceptable text, such as White's *Money and Banking*, may be used as a manual.

213. PUBLIC FINANCE. Class work, four hours. Two semester credits. Professor Kammeyer.

Probably at no time within the experience of the present generation has there been so much general interest in public expenditures and public revenues as now. Public expenditures occasioned by the World War

have risen in five years to a greater total than in any previous century. Taxes and bond issues have been increased proportionally. New revenue laws have been passed and measures devised for carrying the heavy financial burdens of the war and of the reconstruction that will follow. No citizen can or should escape his share of this burden, and he should be informed as never before on the general principles of taxation and public expenditure, for upon his exact information in these matters will depend not only his intelligent discharge of civic duties, but also his patriotic support of the government. This is especially true of teachers. This course aims to be directly applicable to the problem of taxation in the United States and in Kansas, and will be concrete in its treatment. Instruction by lectures, assigned readings, and reports.

225. RURAL SOCIOLOGY. Class work, six hours. Three semester credits. Associate Professor Merritt.

This course deals with the problem of the rural family, the rural school, the rural church, rural societies and associations, the economical and social activities of the community, and the relation of the state to the general welfare. This leads to the study of the reasons for the increased interest in rural sociology and rural problems; the effect of environment and occupations on community life; advantages and disadvantages of rural life; marketing and transportation as factors of community development; the various social institutions of the community, boys' and girls' clubs, men's clubs, the grange, and their possible economic and social activities; the rural church; the rural school; the country life movement and the reorganization of rural social forces. Interdependence of the town, city, and rural life from the viewpoint of their economic and social relations and interests as a necessity for their mutual community development are studied. The fundamental problems of rural life under conditions in this state are analyzed. Instruction is by lectures, assigned readings, and recitations. Text: Voght's *An Introduction to Rural Sociology*.

EDUCATION

Associate Professor KENT, in Charge
 State Club Leader HALL
 Associate Professor ANDREWS
 Assistant Professor PETERSON
 Assistant Professor LLOYD-JONES
 Assistant Professor ZAHNLEY
 Assistant Professor _____

101. PSYCHOLOGY. Class work, six hours. Three semester credits. Assistant Professor Peterson.

A general introduction is here given to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. The work of the course includes the study of a text, outside readings, lectures and class experiments.

105. EDUCATIONAL ADMINISTRATION. Class work, six hours. Three semester credits. Associate Professor Andrews.

This course is a study of the organization of state, city and county schools; the interrelation of boards of education, superintendents, principals, teachers. The school law of Kansas is also studied.

109. EDUCATIONAL PSYCHOLOGY. Class work, six hours. Three semester credits. Prerequisite: Psychology. Assistant Professor Peterson.

The course will deal with those aspects of psychology that have a direct bearing upon educational practices. Attention will be paid to the results of experimental investigations in the field. Lectures and library work.

111. METHODS OF TEACHING. Class work, six hours. Three semester credits. Associate Professor Andrews.

The aim of this course is the development of good classroom technique through detailed study of child experiences as related to the larger demands of education. The work includes lectures, library assignments, and observation of classes. A feature of the course is individual reports and discussions. Prerequisite: Psychology.

113. HISTORY OF EDUCATION. Class work, six hours. Three semester credits. Associate Professor Andrews.

This course is intended to present the successive relationships that have existed between educational machinery and practices and the changing political, economic, scientific, cultural, and ideal environments from primitive times to the present.

121. HOME ECONOMICS EDUCATION. Class work, four hours. Two semester credits. Assistant Professor Lloyd-Jones.

This course offers problems dealing with the place of Home Economics in modern secondary education; the aims and phases of work in various types of schools; the organization, maintenance, equipment and supervision of such departments. Prerequisite: Educational Administration.

125. AGRICULTURAL EDUCATION. Class work, four hours. Two semester credits. Associate Professor Kent.

A comparative study is made of the provisions for agricultural education in this and other states and countries and the principles underlying such education. The part played in agricultural education by community, county, state and nation is discussed. Types of schools, courses of study, adjustment of school work to community needs, and the equipment and administration of agricultural schools are studied. The aim of the course is to fit the student to plan, teach and administer or supervise agricultural work, especially in high schools.

129. INDUSTRIAL EDUCATION. Class work, six hours. Three semester credits. Associate Professor Kent.

This course is a study of typical secondary schools of industrial education and departments on industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in industrial education for elementary and secondary schools; of shop equipment and cost; of the pedagogy of vocational subjects. Prerequisite: Educational Administration.

131. SPECIAL METHODS IN THE TEACHING OF HOME ECONOMICS. Class work, four hours. Two semester credits. Assistant Professor Lloyd-Jones.

This course applies the principles of sound teaching to the selection and development of the subject matter of home economics in lessons for high-school pupils and to the conduct of laboratory and classroom exercises. It is supposed to accompany supervised observation and teaching.

136. SPECIAL METHODS IN THE TEACHING OF AGRICULTURE. Class work, six hours. Three semester credits. Assistant Professor Zahnley.

Training in planning lessons, organizing materials, and conducting class and laboratory work in agriculture is the purpose of this course. The work will include observation, criticism and reports of class exercises, a study of work done in high schools, and the making and criticism of lesson plans and outlines. Special attention is given to selecting laboratory materials, conducting laboratory exercises, and adapting class and laboratory work to each other.

139. SPECIAL METHODS FOR CLUB WORKERS. Class work, two hours. One semester credit. State Club Leader Hall.

This is a course in organizing and conducting garden, corn, pig, canning, bread, garment-making and other clubs for boys and girls.

Methods of organizing, financing and directing these clubs will be studied. The purpose and function of club work in the social, economic and vocational development of the child is emphasized.

211. EDUCATIONAL MEASUREMENTS. Senior year, both semesters. Class work, two hours. Two semester credits. Prerequisite: Educational Psychology. Assistant Professor Peterson.

The course is designed to give a working knowledge of the fundamental principles of educational measurement and an appreciation of the significance of the measurement movement in education. A careful study is made of standard educational tests and scales, with special emphasis upon their value in the improvement of classroom methods and conditions of learning. Attention is given to such statistical methods and devices as are needed for the interpretation of data.

ENGLISH

Professor DAVIS
Associate Professor CONOVER
Instructor HEIZER

101. COLLEGE RHETORIC I. Class work, six hours. Three semester credits. Associate Professor Conover.

This course consists of a rapid review of the principles of sentence structure, outlining, and paragraphing, followed by a study of the elements of effective writing in prose. In connection with the course systematic training is given in the writing of expository themes.

104. COLLEGE RHETORIC II. Class work, six hours. Three semester credits. Prerequisite: College Rhetoric I. Associate Professor Conover.

College Rhetoric II continues the work of College Rhetoric I. Special emphasis is laid on expository and argumentative writing. Attention is directed to practical as well as to literary subjects for the frequent themes written throughout the course.

122. BUSINESS ENGLISH. Class work, six hours. Three semester credits. Professor Davis.

This course comprises a thorough review of business letter-writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements, and a practical study of other forms commonly used in connection with business.

134. METHODS OF TEACHING ENGLISH. Class work, six hours. Three semester credits. Professor Davis.

The teacher of English in the high school often feels the need of new methods of presenting the subject. This course considers particularly the needs of the teacher who has had special training in home economics, agriculture, manual training, or general science, but who has not had such training in English. The class work consists not only of lectures by the instructor, the interpretation of the works assigned for study, and the writing of critical essays, but of the systematic discussion of methods for presenting the classics to the pupils in the high school and of awakening in them a warm, vital appreciation of the best literature, and of the best conduct of composition work under the conditions met in the rural and smaller high schools. A definite program of work for the high-school year is constructed and discussed. The Department of English will accept the work of this course as a substitute for English Literature I.

140. LITERATURE FROM THE READERS. Class work, six hours. Three semester credits. Instructor Heizer.

This course is planned to meet the needs of teachers of rural and grade schools. The aim of the course is to stimulate the teacher's love

for good literature until she becomes conscious of her power to interest, impress, and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping stone to the appreciation of the world's best literature. Special emphasis is placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

180. **ENGLISH LITERATURE HE-II.** Class work, six hours. Three semester credits. Professor Davis and Associate Professor Conover.

A general survey of English literature is given in this course. Lectures are offered on the history of English literature from the earliest times to the present day. In addition, works of representative authors of each period are assigned for reading outside of the classroom. These are discussed in class and passages from them interpreted.

ENTOMOLOGY

Associate Professor TANQUARY
Assistant Professor MERRILL

101. **GENERAL ENTOMOLOGY.** Class work, four hours; laboratory, six hours. Three semester credits. Prerequisites: General Zoölogy I and II, or equivalent. Associate Professor Tanquary.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species, and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they become fitted to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. Field work forms a limited part of the course.

111. **APICULTURE.** Class work, four hours; laboratory, six hours. Three semester credits. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honey-bee. Special attention is given to practical beekeeping, dealing with the best methods practiced among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relation of bees to agriculture and horticulture.

112. **ADVANCED APICULTURE.** One to three semester credits, depending upon the amount of work done. Assistant Professor Merrill.

This course is open to those who have had Entomology III, Apiculture, or its equivalent. The work is largely individual and is outlined to suit the needs of persons registering for the course. Advanced and special work only is given.

HISTORY AND CIVICS

Associate Professor ILES
Assistant Professor JAMES
Instructor OREM

56. **MODERN HISTORY II.** Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the last half unit of Modern History for College entrance. Miss Orem.

This course is designed to set forth the history of Europe since the Thirty Years' War. The rise of Prussia and of Russia, the decline of Spain, the ascendancy of France, the great Revolution, the Napoleonic empire, are the chief subjects for study during the early part of the

course. The latter part is given over to a study of the growth of nationalities in the nineteenth century, special attention being directed toward the social, political and economic developments of the period, as well as to the international relations, all with the object of making clear in some degree the causes operating to bring about the recent World War. The text used will be Harding's *New Medieval and Modern History*, together with Robinson and Beard's *Outlines of European History*. Part II, and assigned readings.

59. AMERICAN NATION I. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or the first half-unit of American History for College entrance. Miss Orem.

This course comprises a survey of American history from the discovery of America to the overthrow of the Federalist party in 1800. It deals with the establishment of the English colonies in America, the growth of social and political institutions in these colonies, the development of an American nationality, the struggle among European nations for possession of North America, the divergent English and American political theories, the causes and meaning of the American Revolution, the schemes for financing the Revolutionary war, the European diplomatic entanglements, the relations of the Continental Congress and the state, the efforts to solve the problem of imperial organization, the Constitutional Convention, and the Federalist organization of the new government. Along with the political history of this period goes a study of America's economic development to 1880. Texts: West's *American History and Government*, and Bogart's *The Economic History of the United States*.

63. CIVICS. Class work, seven and one-half hours. Four semester credits in the School of Agriculture, or one-half unit for College entrance. Miss Orem.

This course, while designed primarily to meet the needs of teachers of civics in grammar schools and in high schools and of those preparing for college, is intended generally as a preparation for the duties of citizenship. Therefore, the emphasis is laid upon the actual workings of American government, with due attention to recent changes and tendencies in state and nation. The text used is Guitteau's *Government and Policies in the United States*, Kansas edition, supplemented by assigned readings.

101. AMERICAN HISTORY I (BEGINNINGS OF THE AMERICAN NATION. Class work, six hours. Three semester credits. Associate Professor Iles.

This course gives special emphasis to the industrial phases of the origin and development of American nationality and democracy to the end of the War of 1812. It also includes our constitutional and political development, especially with reference to origin, basis, cause, and effect. It aims to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history, the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Instruction is given by means of lectures, readings, and recitations.

121. ENGLISH HISTORY. Class work, six hours. Three semester credits. Assistant Professor James.

A survey is made of the whole field of English history, with special emphasis on the modern period. The Tudor and Stuart regimes, with their bearings on constitutional and political advance and New World history, the growth and organization of the empire, the commercial and industrial revolutions, and more recent political, social and industrial

developments, will be studied in as much detail as the time allows. Throughout some notice will be taken of contemporary world history and of England's position in international affairs leading up to her part in the Great War. The course is based on Cheyney's *Short History of England* as a text, with lectures and assigned readings.

126. CURRENT HISTORY. Class work, two hours. One semester credit. Assistant Professor James.

The subject matter of this course varies each semester from that of any other semester. The student is guided in the study of this course by such weekly magazines as *The Independent* and *The Outlook*, supplemented by such monthly periodicals as *The Review of Reviews*, *World's Work*, *Current Literature*, etc. The course is designed to give the student as wide an outlook on contemporary world movements and as good an understanding of the conditions and institutions in the midst of which he lives as can be crowded into two recitation periods per week. At the same time it directs the student to good habits of news reading of the right sort.

127. TEACHERS' COURSE IN HISTORY. Class work, four hours. Two semester credits. Associate Professor Iles.

This is a seminar course of discussions based on Henry Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work, *Method in History*, and supplemented by a study of the *Report of the Committee of Seven*, and of the Committee of Five on *History in the Secondary Schools*, and the Committee of Eight on *History in the Elementary Schools*. A critical examination is made of special books on method in history and civics, such as Wayland's *How to Teach American History*, and of special articles in the *History Teachers' Magazine*. The different texts in history and civics are critically investigated as to points of excellence or weakness, including lectures on the content or viewpoint of each. Information is also given as to the best illustrative material and helps in the teaching of history and civics. This course reveals the evolution in the writing of history, and the growing importance of history and civics in the modern school curriculum, together with the improving viewpoint as to content of both the history and the civic courses.

151. AMERICAN GOVERNMENT. Class work, six hours. Three semester credits. Associate Professor Iles.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on Beard's *American Government and Politics*. Throughout this course special and definite attention is given to recent and current events in governmental activities.

223. MODERN EUROPE (SINCE 1814). Class work, six hours. Three semester credits. Assistant Professor James.

This course traces the evolution of modern European nations since 1814, with special attention to political organization, industrial development, and colonial expansion. Political problems and social and economic adjustments due to the Great War are included. A desirable course for all who wish a large view and clear understanding of the Europe that is now emerging from war. Recitations, lectures, and assigned readings. Text: Hayes' *A Political and Social History of Modern Europe*, Vol. II.

INDUSTRIAL JOURNALISM AND PRINTING

Professor CRAWFORD
Instructor KEITH

102. PRINTING PRACTICE. Laboratory practice, twelve hours. Two semester credits. Mr. Keith.

A study of the composition of general printing-shop practice, including cost finding, is made in this course. The work is adapted to the needs of those taking it, but is intended particularly for high-school teachers of printing and for those who expect to have editorial supervision of publications, including high-school papers. Lectures are given on such subjects as the history of printing, artistic typographical arrangement, and the use of printing as an aid in the study of spelling, punctuation, and English composition. More advanced work will be given to students prepared for it.

107. ELEMENTARY JOURNALISM. Class work, four hours. Two semester credits. This course should be accompanied by Journalism Practice I to give four semester credits. Professor Crawford.

This course is designed to give the students practical experience in the fundamentals of newspaper work. It is intended to prepare for more advanced courses in journalism or to give necessary training for effective use of the written articles in farm bureau, educational, and other vocational activities. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental and ethical demands made upon him are briefly presented. Attention is given to the history and scope of journalism. In the Summer School, this course takes up also the teaching of news writing in the high school.

110. JOURNALISM PRACTICE I. Laboratory practice, twelve hours. Two semester credits. Professor Crawford.

This course embodies actual practice in journalism, as closely approximated as possible to actual newspaper work. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work is adapted to the needs and qualifications of each student.

225. CURRENT PERIODICALS. Class work, four hours. Two semester credits. Professor Crawford.

The course comprises a study of current periodicals of various types. Special emphasis is laid on the material that they contain and the nature of its appeal to the reader. It is a nontechnical course, intended to give general students or teachers some knowledge of the field of current periodical literature.

MATHEMATICS

Professor WHITE
Assistant Professor STRATTON
Instructor FEHN

53. BOOKKEEPING. Class work, four hours. Two semester credits. Mr. Fehn.

The object of this course is to teach the fundamental principles of bookkeeping and accounting and their practical applications. Business papers will be used as a basis for the study of all business transactions. Text: Lyons and Carnahan's *Bookkeeping*.

62. ALGEBRA II. Class work, seven and a half hours. Four semester credits. Assistant Professor Stratton.

This course takes up ratio and proportion, graphical representation, simultaneous equations, involution, evolution, theory of exponents, radicals, quadratic equations, and applications to practical problems. Text: Hawkes, Luby and Touton's *First Course in Algebra*.

66 PLANE GEOMETRY I. Class work, seven and a half hours. Four semester credits. Mr. Fehn.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Class work, seven and a half hours. Four semester credits. Assistant Professor Stratton.

Books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Class work, seven and a half hours. Four semester credits. Professor White.

This course comprises the usual theorems and constructions, including the relation of planes and lines in space, the properties and measurements of prisms, cylinders, pyramids, and cones; the sphere and spherical triangle. The solution of many numerical and original exercises is required and mensurations of surfaces and solids is treated. Text: Wentworth and Smith's *Plane and Solid Geometry*.

101. PLANE TRIGONOMETRY. Class work, six hours. Three semester credits. Mr. Fehn.

Measurement of angles, functions of any angle, functions of multiple and submultiple angles, sum and difference formulæ are included in this course. Triangles and trigonometric equations are solved. Text: Palmer and Leigh's *Plane and Spherical Trigonometry*.

104. COLLEGE ALGEBRA. Class work, six hours. Three semester credits. Mr. Fehn.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text: Hawkes' *Higher Algebra*.

110. ANALYTICAL GEOMETRY. Class work, seven and a half hours. Four semester credits. Professor White.

Coördinate systems and applications; loci; the straight line, circle, parabola, ellipse, and hyperbola are studied in this course. The subject matter is that of the usual first course. Text: *Brief Course in Analytic Geometry*, by Tanner and Allen.

113. CALCULUS I. Class work, ten hours. Five semester credits. Professor White.

The usual topics of differential calculus are considered, together with integration of standard forms, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to work of engineering students. Text: Phillip's *Differential and Integral Calculus*.

116. CALCULUS II. Class work, six hours. Three semester credits. Assistant Professor Stratton.

The subject matter of this course belongs in the main to integral calculus. Emphasis is laid upon the applied side. Problems involving areas, lengths, surfaces, and volumes are treated by methods of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text: Phillip's *Differential and Integral Calculus*.

123. TEACHERS' COURSE IN HIGH-SCHOOL MATHEMATICS. Class work, two hours. One semester credit. Professor White.

This course undertakes an examination of the subject matter and methodology of high-school mathematics. It includes a study of high-school needs and of high-school courses in algebra, geometry and trigonometry, with bibliographies and other sources of assistance in teaching high-school mathematics. The course includes also a study of the mathematical situation of the past decade as regards the high-school, with present outlook problems and purposes. The work proceeds by readings, lectures, and reports. The student should have as a basis of his work Young's *The Teaching of Mathematics*.

124. TEACHERS' COURSE IN ARITHMETIC. Class work, two hours. One semester credit. Assistant Professor Stratton.

This is a course for rural and grade teachers and those interested in the applications of arithmetic to the everyday problems of the farm, shop, and home. Special attention is given to a study of the sources and the preparation of supplementary problems for schools. Some attention is given to the history, recent studies and advancements, and approved methods of presenting the subject. Texts: Stratton and Remick's *Agricultural Arithmetic*, and Brown and Coffman's *How to Teach Arithmetic*.

MODERN LANGUAGES

FRENCH

Instructor LIMPER

151. FRENCH I. Class work, six hours. Three semester credits.

The phonetic symbols being a great help in the acquisition of accurate pronunciation, the first two days are devoted to learning these symbols and a number of useful expressions in French. The recitations are conducted largely in French and considerable time is devoted to conversation. Nevertheless, conversation is considered merely a means to the acquisition of a reading knowledge of French. The fundamentals of Grammar are covered in this course and reading matter in the grammar is supplemented by a reader. Text: Olmsted's *Elementary French Grammar* (first twenty-two lessons) and Allen and Schoell's *French Life* (thirty pages).

156. FRENCH II. Class work, six hours. Three semester credits.

This course is a continuation of French I. The grammar is completed, special attention being given to irregular verbs. Reading and conversation are continued throughout the course. Students who have had one year of French in high school begin with this course. Texts: Olmsted's *Elementary French Grammar* (Lesson XXII to the end) and Allen and Schoell's *French Life*.

161. FRENCH READINGS. Class work, six hours. Three semester credits.

This is essentially a reading course, the purpose being to enlarge the student's vocabulary. Grammar is reviewed and considerable time is devoted to conversation. Fontaine's *En France* and one other short French text are read.

SPANISH

Instructor LIMPER

181. SPANISH II. Class work, six hours. Three semester credits.

In addition to study of grammar, which is here completed, considerable reading is done. Stress is laid upon training the ear to understand spoken Spanish. Texts: Hills and Ford's *First Spanish Course* (completed), and Bergé-Soler and Hatheway's *Elementary Spanish-American Reader*.

MUSIC*

Professor WESTBROOK
Associate Professor BROWN
Instructor JOHNSTON
Instructor SMITH

101. HARMONY. Class work, four hours. Two semester credits. Associate Professor Brown.

The course in harmony includes the study of scales and intervals, primary and secondary chords and their inversions, harmonizing given bases and melodies, ear training, the chord of the dominant seventh, and keyboard harmony. Students contemplating teaching music in public schools will find this work invaluable to them, as it is the grammar and mathematics of music. At least five must enroll for harmony or the class will not be organized.

110. HISTORY OF MUSIC I. Class work, two hours. One semester credit. Associate Professor Brown.

A brief survey of the primitive development of the art is given, together with special attention to the classical and romantic periods and present-day conditions and tendencies. The work is made especially interesting by use of copious illustrations on the phonograph.

120. PUBLIC-SCHOOL MUSIC. Class work, four hours. Two semester credits. Professor Westbrook, Associate Professor Brown.

This course is a general survey of music in public schools from the primary grades through the high school. Methods of presenting music to children in the different stages of development are taught and materials for such work are studied. Suggestions for community music work are also given.

130. VOICE. Private instruction. Professor Westbrook and Instructor Johnston.

Hours to suit the convenience of students are arranged for those wishing private vocal instruction. For two half-hour private lessons a week one credit is given.

135. VIOLIN. Private instruction. Associate Professor Brown.

This work is organized after the same plan as vocal instruction. Credit of one hour is given for private instruction.

140. PIANO. Private instruction. Miss Smith.

This work is organized the same as Voice and Violin and a special piano teacher is in charge.

150. CHORUS. Two hours. Twice a week, one-hour periods. One semester credit. Professor Westbrook.

Every student enrolled in the Summer School is urged to sing in the chorus. This work will be the study and public presentation of beautiful choruses.

151. ORCHESTRA. Two hours. One semester credit. Associate Professor Brown.

Every individual who plays an orchestral instrument is urged to bring that instrument and play in the Summer School Orchestra. High-grade orchestra music is studied and is presented in public performances.

* The following fees are charged for private instruction in music:

Two half-hour voice lessons per week throughout the term, with Director Westbrook.....	\$19.00
Same, with Instructor Johnston.....	14.00
Violin or band instruments, with Associate Professor Brown	14.00
Piano, with Miss Smith.....	14.00

The fees named are just one-half of the regular College semester fees.

PHYSICAL EDUCATION

Professor CLEVENGER
Assistant BOND

COURSES FOR MEN

Courses for men are designed primarily to instruct men who desire expert practical knowledge of the best methods of coaching football, base ball, basket ball, and track and field athletics. These courses should appeal strongly to men who plan to take up coaching as well as to men already engaged in coaching in high schools and colleges.

These courses will be conducted by lectures and by practical demonstrations.

Throughout all the courses, lectures and demonstrations will be given on the care and prevention of injuries, how to guard against injuries, how to care for them, and the best methods of bandaging sprains and weak joints.

126. FOOTBALL. Lectures and recitations, four hours. Two semester credits. Professor Clevenger.

This course will cover the following phases: spirit of the game, discussion of the rules, tackling the dummy, charging sled, defense in general, line defense, secondary defense, kick-off, punting, place kicking, drop kicking, direct pass plays, systems of offense in general, quarterback pass plays, interference, signals, training, and equipment.

130. BASKET BALL. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The work will cover the discussion of the rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, different styles of play, offense, defense, team work, selection of players, training and equipment.

135. BASE BALL. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

The course will cover the discussion of the rules, fielding, batting, bunting, base running, sliding, team work, pitching, catching, proper way to play each position, indoor and outdoor practice methods, coaching, signals, training and equipment.

140. TRACK AND FIELD SPORTS. Lectures and recitations, two hours. One semester credit. Professor Clevenger.

This course will cover the discussion of the rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throwing, javelin throwing, training, dieting, and equipment.

COURSES FOR WOMEN

175. GYMNASTICS. Lectures and recitations, one and one-half hours; practical work, three hours. One semester credit. Miss Bond.

This course is especially planned for the needs of the teacher in the public schools where no special teacher in this subject is employed. Lectures are given on the general theory of gymnastics and the physiological reason for each exercise. A notebook is required.

Practical Work. The practical work includes free exercises, hand apparatus, heavy apparatus, and practice teaching.

178. FOLK DANCING. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the physiological benefit derived from the dances, on costuming, and on the use of the dances in festivals and fetes. A notebook is required.

Practical Work. This course offers graded folk dances of the different nations, suitable for use in schoolrooms, playgrounds, or gymnasiums.

181. GAMES. Lectures and recitations, one hour; practical work, four hours. One semester credit. Miss Bond.

Lectures are given on the problems of grading games, and on the physiological benefits received. A notebook is required.

Practical Work. This course offers practice in games for grammar schools, high schools, playgrounds and gymnasiums.

184. ESTHETIC DANCING. Practical work, three hours. One-half semester credit. Miss Bond.

Practical Work. This is a class for beginners. Technique and simple esthetic dances are taught. No exercise gives better training in muscle control, poise, and good carriage than does esthetic dancing.

187. TECHNIQUE OF BASKET BALL, BASE BALL, AND HOCKEY. Lectures and recitations, three hours. One semester credit. Miss Bond.

This course is devoted to the technique of these sports, the physiological benefit derived, and the organization of each into interclass contests.

190. SWIMMING. Five hours. No credit. Miss Bond.

PHYSICS

Professor HAMILTON
Associate Professor RABURN
Assistant Professor STEWART

31. GENERAL SCIENCE. Class work, six hours. Three semester credits for admission; no College credit. Assistant Professor Stewart.

This course is intended for those teachers who are required to offer courses in general science in public-school work. The course includes class, laboratory and field work. It is based on such everyday problems as: Water supply, air supply, weather predictions, light supply, prime motors, transportation, crops, and similar problems, with a study of what science in general has done and can do to solve them. Text to be selected.

41. INTRODUCTORY PHYSICS. Class work, four hours; laboratory, six hours. Three semester credits for admission; no College credit. Assistant Professor Stewart.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject is covered and some time given to working problems. Simple experiments and demonstrations are given. The course is a good review for those who have had high-school physics. Students who expect to take county examinations for certificates to teach are advised to take this course. Text: Black and Davis's *Physics*.

51, 61. ELEMENTARY PHYSICS I (A-I, H-I). Class work, six hours; laboratory, four hours. Four semester credits in the School of Agriculture. Prerequisite: Algebra III. Assistant Professor Stewart.

This course is intended to give a general view of mechanics, sound and heat. Special emphasis is placed upon principles which will be met again in later work in the same or other sciences. Text: Black and Davis's *Physics*.

52, 62. ELEMENTARY PHYSICS II (A-II, H-II). Class work, six hours; laboratory, four hours. Four semester credits in the School of Agriculture. Prerequisite: Course 51 or 61. Associate Professor Raburn and Assistant Professor Stewart.

This is a continuation of Elementary Physics I and includes a study of light, magnetism and electricity. The fundamental laws are studied and illustrated and the working principles of many electrical appliances in daily use are made the subject of class discussion.

101. HOUSEHOLD PHYSICS. Class work, six hours. Three semester credits. Professor Hamilton.

This is a course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination of the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliances and of the operator.

120. PHOTOGRAPHY. Class work, two hours; laboratory, six hours. Two semester credits. Professor Hamilton.

The importance of a record of exact details, as shown in photography, makes this work valuable to all scientists. The course gives the student some knowledge of chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargements, and the prints best adapted for illustrative articles in newspapers and magazines.

130. WIRELESS TELEGRAPHY. Class work, two hours; laboratory, six hours. Two semester credits. Prerequisite: Elementary physics. Professor Hamilton and Assistant Professor Stewart.

The work includes a study of the most efficient types of receiving and transmission sets, a study of the fundamental principles of electric waves, and of the most important points to be observed in the erection of a good plant.

Laboratory.—The student learns in the laboratory to receive and to transmit messages and as he learns the code he is instructed in field work.

201, 211. COLLEGE PHYSICS I (GENERAL PHYSICS I OR ENGINEERING PHYSICS I). Class work, seven and one-half hours; laboratory, six hours. Five semester credits. Professor Hamilton.

This is a course in mechanics, heat and sound. It or its equivalent is required of general science and engineering students. The course is intended to give the student a thorough working knowledge of the fundamental units and laws involved in force, work, power, and energy, with a discussion of the fundamental laws of gases and liquids, as they occur in the transformation and transmission of force and energy. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

Laboratory.—The laboratory work consists in the use of apparatus devised for testing the laws of inertia, moments of force, moments of torsion, and elasticity, together with measurements in thermometry and calorimetry.

202, 212. COLLEGE PHYSICS II (GENERAL PHYSICS II OR ENGINEERING PHYSICS II). Class work, seven and one-half hours; laboratory, six hours. Five semester credits. Associate Professor Raburn.

This is a course in electricity and light. It or its equivalent is required of general science and engineering students. The work in electricity is of such a nature as to give a working knowledge of the units employed, and of the fundamental laws; and to acquaint the student with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Textbook, Kimble's *College Physics* or Reed and Guthe's *College Physics*.

224. **TEACHERS' COURSE IN PHYSICS.** Class work, four hours; laboratory and library, six hours. Three semester credits. Associate Professor Raburn.

The course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel-plating, etc. The laboratory includes the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted to the presentation of those topics which present special difficulty, to advise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our high schools of Kansas. This course is intended for those who are either teaching or expecting to teach physics in secondary schools.

PUBLIC SPEAKING

Professor BURNS
Instructor HEIZER

101. **PUBLIC SPEAKING I.** Class work, four hours. Two semester credits. Professor Burns.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticisms and points of theory, given by the instructor, supplement the practice work. Conviction, not entertainment, is the dominant purpose in the course.

201. **EXTEMPORE SPEECH I.** Class work, four hours. Two semester credits. Professor Burns.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticisms and points of theory, given by the instructor, supplement the practice work. Conviction, not entertainment, is the dominant purpose in the course.

203. **ADVANCED PUBLIC SPEAKING.** Class work, two hours. One semester credit. Professor Burns.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lecture, or address during the term. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks or of addresses suitable for extension work.

204. **DRAMATICS.** Class work, four hours. Two semester credits. Miss Heizer.

This is not an elaborate study of the drama, but aims to give instruction in dramatic presentation. Practice work predominates. Special attention is paid to "home talent" or amateur theatricals, and methods of coaching are suggested. The "Little Country Theater" idea is developed.

205. **PUBLIC SPEAKING FOR TEACHERS.** Class work, four hours. Two semester credits. Professor Burns.

This course is designed, first, to give the teacher training in the art of reading and speaking from the public platform; second, to give the teacher a knowledge of the principles of public speaking as they apply

to pedagogy. Practice work predominates. The situation in the grades and high schools is covered. Special emphasis is placed upon the teaching of reading in the schools.

220. SUMMER SCHOOL PLAY. Miss Heizer.

The department prepares and presents during the session one amateur play. The Summer School plays are of a standard type, good royalties being paid to secure them. Any student enrolled in the Summer School is eligible to try out for the cast.

ZOÖLOGY

Associate Professor HARMAN
Assistant HURD

105. GENERAL ZOÖLOGY. Class work, six hours; laboratory and field work, twelve hours. Five semester credits. Required in the curricula in agriculture and home economics; with an extra credit hour will satisfy the requirement in general science. Associate Professor Harman or Instructor ———.

The structures and functions of types of both invertebrates and vertebrates, and animal relations, are studied in the class and on field trips.

Laboratory.—Studies are made of the form and function of types of living animals, and dissections and reconstructions made of the important systems of selected types. A considerable part of the laboratory time is spent in the field identifying and studying animals in their natural relations.

108. EMBRYOLOGY AND PHYSIOLOGY. Class work, six hours; laboratory, twelve hours. Five semester credits. Prerequisite: General Zoölogy, or its equivalent. Associate Professor Harman.

The first three-fifths of the term is devoted to (a) embryology and the remaining two-fifths to (b) human physiology. The course thus falls into two closely related parts: (a) a study of the development of the germ cells, fertilization, origin of the germ layers, initiation and growth of systems of organs, establishment of foetal relations, and nutrition and growth with special reference to the human; and (b) a study of the functions of the organs and systems of the human body, with special consideration of the digestive, respiratory, circulatory, nervous, and urogenital systems and organs of special sense.

Laboratory.—The laboratory work includes: (a) Studies of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and whole mounts and serial sections of the chick and pig embryos in several stages of development, with demonstrations of types of mammalian foetal relations, and (b) experiments for the demonstration of the composition and functions of bone, blood, lymph, and the reaction of muscles, nerves, parts of the digestive, respiratory, excretory and other systems.

Division of College Extension

H. UMBERGER,* *Dean*

The people of Kansas believe in using their educational institutions to their full capacity, not only for the students privileged to come to them, but also for the State at large. They know that the number who complete a College course in agriculture, engineering, or home economics is small in comparison to the great majority of the people who can not go to college, and it is their wish that this majority also may be served. With this desire the Agricultural College is in full sympathy, and it is its ambition not only to give its resident students the best possible training for leadership in life's work but to be of direct service to every community of the State.

As far back as 1864 conventions of the farmers of Manhattan and vicinity were held at the College. The first well-organized farmers' institute conducted under the auspices of the faculty was held at Manhattan, November 14, 1868, and this was followed by a similar gathering at Wabaunsee, November 21 and 22 of the same year. In 1868 the Board of Regents adopted a resolution recommending "that a system of lecturing on agricultural subjects at this College and the populous settlements of the several counties of the State should be conducted so that the benefits of farming according to correct agricultural principles may be disseminated throughout the State."

A few meetings were held each year for the next several years, increasing in number from 1879, but no definite appropriation for extension work was made until 1899, when \$2,000 per year was appropriated for this purpose by the State legislature. The annual appropriation remained at this figure until 1905, when the legislature appropriated \$4,000 for the work, to which the College added \$800. Up to 1905 no regular staff for extension work was employed, and all extension activities were conducted by a committee. In October of that year, however, a superintendent to organize the institute work was selected by the Board of Regents, and in July, 1906, the Department of Farmers' Institutes was formally organized.

The interest in extension work throughout the State now developed rapidly. In 1907 the legislature appropriated \$10,500 for the two years, to which the College added \$1,000. In 1909 the belief in the value of agricultural extension was so great that \$52,500 was appropriated by the legislature for the biennium, and this amount has been increased by each succeeding legislature, \$35,000 being appropriated for 1912, \$40,000 for the year 1913, \$45,000 for 1914, and \$50,000 for the year ending June 30, 1915.

* Acting dean previous to July 1, 1919.

This rapid development of extension work was made possible not only because the people of the State wished to have such work done, but because much new light has been thrown on the essentials in agriculture by the effective experimental work done by the Experiment Stations and by the United States Department of Agriculture.

In 1914 the federal government felt that the useful and practical information on subjects connected with agriculture and home economics developed by the experiment stations, by the Department of Agriculture, and by the experience of the best farmers and farm homes should be made more readily available to everyone; and in order that it might be more fully and effectively diffused among the people of the several states and its practical application encouraged, the Congress of the United States, in 1914, passed the Smith-Lever bill, which provides for "coöperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an act of Congress approved July 2, 1862, and of acts supplementary thereto, and the United States Department of Agriculture." To further this act the Congress provided for an annual appropriation of \$480,000, of which \$10,000 is paid each year to each State which assents to the provisions of the act. This initial appropriation is increased each year for seven years, such increase being allotted annually to each State in the proportion which the rural population of such State bears to the total rural population of all the states, providing an equal sum has been appropriated for that year by the legislature of such State, or has otherwise been provided from within the State, for the maintenance of the coöperative agricultural extension work.

Under this act the coöperation of the agricultural colleges and the United States Department of Agriculture has been assured, extension work has become a national as well as state project, and its effectiveness has been greatly increased.

The governor of the State and the Kansas legislature of 1914 accepted the provision of the Smith-Lever act immediately, and \$10,000, therefore, was secured from the Federal Government for extension work for the year ending July 30, 1915. The additional sums coming from the federal funds under this act to the State for the year ending June 30, 1916, and 1917, respectively, were \$14,555.45 and \$26,685, and for the years 1918 and 1919, \$38,816 and \$50,946, respectively. These sums were offset by an equal appropriation by the legislature of Kansas, and in addition, from the appropriation made to the Agricultural College for all its work, \$30,000 was set aside for extension work for the year ending June 30, 1919. The total sum for extension work under the Smith-Lever act and from State funds for the year ending June 30, 1919, therefore, is as follows: From the Federal Government through the Smith-Lever act, \$60,944.10; from the State through the Agricultural College, \$30,000; from the State direct, appropriation to offset the Smith-Lever appropriation, \$50,944.10: Total, \$141,888.20.

Another act of the legislature, of very great importance to the extension activities of the Agricultural College and to the State, went into effect July 1, 1916. This is known as the county farm bureau law, or "An act providing for State and county appropriations for the support

of county farm bureaus." It provides "that whenever there shall be organized in any county in the State of Kansas a county farm bureau having a membership of 25 percent of the *bona fide* farmers of the county, or as many as 250 farmers, and having for its purpose the giving of instructions in agriculture and home economics to the people of said county through practical demonstrations and otherwise, and the employment of a county agricultural agent or agents to prosecute this work, the Kansas State Agricultural College shall contribute, from federal and State funds granted for demonstrations in agriculture and home economics, not less than \$800 nor more than \$1,600 per annum, as far as such funds are available, towards the salary of such county agricultural agent; . . . provided, that before such appropriation is made the county farm bureau shall present to the county commissioners of its county a copy of the constitution and by-laws adopted by the farm bureau and approved by the Kansas State Agricultural College, and a certified statement of deposit in a local bank of the county of not less than \$800, which shall be used, subject to the order of the county farm bureau, for providing the necessary equipment for said bureau." It is provided further that when these conditions have been fulfilled the "board of county commissioners shall appropriate from the public funds of the county a sum of money not less than \$800 per annum and not to exceed \$1,600 per annum to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau."

The administration of this law was placed in the hands of the Kansas State Agricultural College by a general clause providing that the work of the agricultural agent shall be "under the general direction and supervision of the Kansas State Agricultural College" and "the constitution and by-laws of each bureau and all accounts and expenditures of funds provided for by this act shall be subject to the approval of the director of extension of the Kansas State Agricultural College."

Since this act became effective, July 1, 1915, seven of the original ten county farm bureaus have availed themselves of its provisions, thirty-seven additional counties have organized farm bureaus that are at work, and many others are organizing.

Soon after the United States entered the war, in 1917, the government initiated legislation to provide funds for placing an emergency county agent in every county in the United States, and a home demonstration agent in as many counties and larger cities as possible. This legislation became effective in August, 1917, and made available an appropriation to cover the salaries, in whole or in part, of a large number of men county agents and a considerable number of emergency home demonstration agents in each state. By January 1, 1918, twenty-four emergency agents, eight assistant county agents, and fifteen home demonstration agents had been placed in Kansas on these funds. By January 1, 1919, sixteen of the counties that had been served by emergency county or district agents had organized farm bureaus. In addition there were twenty-two emergency home demonstration agents at work in the State. The director of the extension service for each State is charged with the responsibility of administering this work thus serving as the joint representative of the State and of the Federal Government.

The rapid growth of extension work has demanded efficient administrative machinery. In the judgment of the President of the College and the Board of Regents it became necessary to create, in December, 1912, a Division of College Extension coördinate with the other divisions of the College. This at first was subdivided into four distinct sections or departments, but the increase in work and personnel of the division has made necessary a reorganization into eight departments, namely: institutes and extension schools, county-agent work, boys' and girls' club work, home economics, emergency home demonstration-agent work, drainage and irrigation engineering, rural service, and home-study service, each with its own head and staff. The heads of the departments are responsible to the director, who is Dean of the Division of College Extension. Through this organization it is possible to administer the extension work effectively and economically, to reach directly more than 500,000 people in the State each year, and to conduct some activity in every county.

During the war the policy of the Division of College Extension was to be directly helpful in winning the war. Maximum production of food, conservation and economic utilization of farm products, effective organization among farmers, and bringing about a comprehensive understanding of our war aims and a zeal to win on the part of all the people of the State were the underlying purposes of all the work of the division. Whenever a department needed reorganization to meet these purposes this was effected.

Publications covering practical subjects in the field of agriculture, home economics and rural engineering are issued from time to time by the Division of College Extension as bulletins, circulars and leaflets. The authors of these publications are the extension specialists or the specialists of the departments in the other divisions of the College. The regular publications of the Experiment Station also are used extensively in the extension work. A series of publications in coöperation with the United States Department of Agriculture is receiving special attention. Extension publications are mailed regularly to a list, composed of members of farm and home institutes, home-makers' clubs, extension schools, and farm bureaus; *i. e.*, to members of organizations coöperating closely with the Agricultural College. Any citizen of the State, however, on request, may secure copies of individual publications.

While the extension work is directed by the Division of College Extension for administrative efficiency, its scope would be limited were it not for the close coöperation of the other divisions and departments of the College, which help not only in supplying lecturers for agricultural meetings and extension schools, material for publication, assistance in demonstration work and helpful counsel, but also are responsible for all subject matter taught by the extension specialists.

Institutes and Extension Schools

A. C. HARTENBOWER, Superintendent
 MABLE CALDWELL, Assistant to the Superintendent
 H. J. BOWER, Soils.
 ROSS M. SHERWOOD, Poultry
 JOHN L. FREHN,* Poultry
 RALPH KENNEY, Crops
 E. G. KELLY, Entomology
 R. W. KISER, Animal Husbandry
 C. F. JOHNSON,* Animal Husbandry
 C. G. ELLING,* Sheep Production
 W. E. PETERSON,* Dairy Husbandry
 H. E. DODGE, Dairy Husbandry
 HAROLD SIMONDS, Horticulture
 GEO. M. POTTER,* Veterinary Medicine
 T. A. CASE, Veterinary Medicine
 J. W. BLACHLY,* Plant Pathology

The Department of Institutes and Extension Schools has direct supervision over approximately three hundred and fifty farm and home institute organizations, all two-day and three-day extension schools in agriculture and home economics, and the work of the extension specialists.

Each farm and home institute of the State is an association or farmers' club, with regular officers, constitution and by-laws, and is required by law to meet at least annually. While some organizations hold six or more monthly meetings, practically all of them have no fewer than three monthly meetings, because no institute organization can obtain State aid unless it has at least three meetings in addition to the annual meeting at which some representative of the College is present. The College plans to send two specialists, one in agriculture and one in home economics, to present at the annual meeting certain well-defined lessons. The specialists and their subjects are chosen because of a known need or interest in a particular community or a plan to start or encourage certain definite lines of work.

The programs for all annual meetings are based on suggestive outlines sent out by this department. These are completed and returned by the local officers. The department furnishes literature, on request, for members who are to take part in the program of an institute, grange, farmers' union or other organization.

The monthly meetings which are held by many of the local organizations in this State are an important feature of the institute work. These meetings are usually held on the second Saturday afternoon of each month from September to May. The Department of Institutes and Extension Schools suggests the subject for discussion, and the same subject is discussed in every institute in the State. In this way certain important, timely subjects are being discussed by thousands of farmers and their wives at seasonable times, thus promoting a general uniformity of action.

Each year some special topics, such as farm management, the management of livestock, gardening, some phase of dairying, etc., are made especially important in institute programs, either for the whole State or for certain specified districts. During 1918 the monthly meetings were largely concerned with the consideration of topics of value to farmers and their wives interested in winning the war.

* The U. S. Department of Agriculture coöperates in furnishing directly all or a part of the salaries and the franking privilege.

Every institute has a membership paying a membership fee. The membership lists constitute the mailing list for the publications issued by this department. In addition to receiving these pamphlets, each member who fills out and returns a membership blank receives from the College, from the government or from some state experiment station such other obtainable literature as his interests demand.

EXTENSION SCHOOLS

The demand among men and women for instruction in the essentials of agriculture and home economics is steadily increasing. Owing to the nature of the farm and home institutes they are able to meet this demand only in part, and for that reason extension schools or short courses in agriculture and home economics have been organized in communities which desire more complete courses in these subjects than can be given at the institutes.

The College now conducts extension schools in agriculture and home economics of three days' duration, sending to each school four instructors. Here well-planned, comprehensive courses are given in the various lines of agriculture and home economics, so that some of the essentials of these subjects may be learned. The local committees are required to organize the classes and pay the local expenses for each school. The Agricultural College supplies the teachers and pays their railroad fares from funds appropriated to it for this purpose.

In addition to these general schools, special schools in breeding, animal diseases, dairying, poultry, orcharding, road making, and cement construction are held in communities desiring them and willing to defray the local expenses. Five-day schools in home economics may be had on request. (See Home Economics, page 339.)

Extension schools are popular where the communities are brought to understand the work given. Almost every community having one school has petitioned for another. Because of the seemingly more important war work no attempt was made to push the schools, and only those communities which assured the College of more than ordinary interest were given schools.

EXTENSION SPECIALISTS

The specialists of this department work in extension schools and institutes during the winter months only. During the spring, summer and fall they conduct special campaigns, such as silo building, wheat improvement, grasshopper control, cow testing, hog-cholera control, and other campaigns, and coöperative demonstration work. The latter phase of the work of the extension specialists is being especially met by the organization of coöperative demonstration work in each branch of agriculture in a certain number of counties each year. In much of the coöperative work each specialist has from two to six coöperators in each county. These men and women work under the direction of the specialists and the supervision of the county agents, keep records of the work, and call demonstration meetings at their farms on each trip of the specialist. The number of visits which each specialist makes to each

point varies from two in the case of the specialist in soils to six in the case of the specialists in horticulture and entomology. The aim in all of this coöperative demonstration work is to show as well as to explain. This line of work is especially appreciated and the representatives of the department have been able to meet only a fraction of the demands upon them.

Educational work in hog cholera is conducted in counties where the Agricultural College is requested to put it on. One veterinarian devotes all of his time to this work, holding educational meetings in every community until every farmer has had opportunity to attend a meeting near his home.

The calls for the extension specialists in all lines of work are so many that it is impossible to meet more than two-thirds of the calls for assistance from county agricultural agents and from farmers' organizations. While the number of specialists is being increased rapidly, yet the work is growing far more rapidly, thus indicating a healthy condition.

Agricultural Agent Work*

H. UMBERGER, Dean and County Agent Leader
A. F. TURNER, Assistant County Agent Leader
G. E. PIPER, Assistant County Agent Leader
KARL KNAUS, Assistant County Agent Leader
P. E. McNALL, Farm Management Demonstrator

EMERGENCY DEMONSTRATION AGENTS AT LARGE

J. M. KESSLER, Topeka
F. A. DAWLEY, Manhattan
C. A. SCOTT, Manhattan

DISTRICT AGRICULTURAL AGENT

L. E. WILLOUGHBY, Hays

COUNTY AGRICULTURAL AGENTS

F. S. TURNER, Anderson County	H. L. HILDWEIN, Kingman County
O. C. HAGANS, Atchison County	GEO. W. SALISBURY, Labette County
THOMAS E. CLARKE, Barber County	I. N. CHAPMAN, Leavenworth County
WARD S. GATES, Barton County	H. L. POPENOE, Lyon County
A. C. MALONEY, Bourbon County	J. L. GARLOUGH, Marion County
PRESTON O. HALE, Chase County	R. L. BARNUM, Marshall County
A. C. HANCOCK, Cheyenne County	C. L. HOWARD, Meade County
E. J. WILLIS, Cherokee County	L. R. ALT, Miami County
O. B. BURTIS, Clay County	HAYS M. COE, Montgomery County
E. L. GARRETT, Comanche County	A. L. CLAPP, Morris County
H. F. TAGGE, Doniphan County	V. M. EMMERT, McPherson County
FRED T. REES, Douglas County	J. M. MURRAY, Nemaha County
C. E. CASSEL, Finney County	C. D. THOMPSON, Neosho County
JOHN V. HEPLER, Ford County	R. P. SCHNACKE, Pawnee County
F. J. ROBBINS, Franklin County	L. E. HOWARD, Pratt County
H. J. ADAMS, Gray County	E. I. MARIS, Rawlins County
W. W. WRIGHT, Greenwood County	E. J. MACY, Sedgwick County
W. A. WUNSCH, Harvey County	C. W. SHULL, Seward County
J. W. THORNBURGH, Hodgeman County	F. O. BLECHA, Shawnee County
E. H. LEKER, Jackson County	W. A. BOYS, Sumner County
A. E. JONES, Jewell County	R. W. SCHAFER, Washington County
HARRY S. WILSON, Johnson County	R. O. SMITH, Wilson County
JOE M. GOODWIN, Jefferson County	A. G. VAN HORN, Wyandotte County

* The U. S. Department of Agriculture coöperates in furnishing all or a part of the salary of every member of this department. In the case of county agricultural agents, counties, through farm bureaus, furnish a part of the salaries and of the expenses.

EMERGENCY DEMONSTRATION AGENTS

T. W. ALLISON, Elk and Chautauqua Counties
 JOHN A. SCHEEL, Osage and Coffey Counties
 P. H. WHEELER, Kearny and Hamilton Counties
 E. F. TINKER, Rooks and Graham Counties
 G. W. SIDWELL, Greeley and Wichita Counties
 R. B. MEDLIN, Thomas, Logan, Wallace and Sherman Counties
 H. T. CORSON, Allen and Woodson Counties
 P. E. CRABTREE, Scott and Lane Counties
 A. B. KIMBALL, Clark and Kiowa Counties
 W. R. BOLIN, Ottawa, Dickinson and Saline Counties

The agricultural agents are active in conducting demonstrations in the best methods of production, in assisting farmers with suggestions and plans relative to farm management and the farm business, and in organizing rural activities. The field demonstrations are conducted for the purpose of introducing new crops, and of testing relative values of varieties already grown and methods of cultivation and harvesting. Demonstrations in proper methods of feeding, care and management of livestock are conducted. Methods of controlling insects and diseases of farm crops, orchards and gardens, and diseases of livestock are demonstrated. Surveys of the farm business are made in order to study the conditions prevailing in typical areas and possible improvements in farm-management methods that should be employed. Improved methods of marketing and community welfare in which better social relations are fostered also are important features of this work. The agent interests himself in practically every farm activity, especially where there is need of improvement.

DISTRICT AGENTS. The College employs one district agricultural agent with headquarters at Hays. His duties are to assist those agents located in the northwest district west of the east boundaries of Smith, Osborne, and Russell counties, and north of the south boundaries of the counties of Greeley, Wichita, Scott, Lane, Ness, Rush, and Barton.

COUNTY AGENTS. In addition to the district agents, the College has assisted in locating county agricultural agents in the following counties: Anderson, Atchison, Barton, Bourbon, Chase, Cheyenne, Cherokee, Clay, Doniphan, Douglas, Finney, Ford, Franklin, Greenwood, Harvey, Hodge-man, Jackson, Jefferson, Jewell, Johnson, Kingman, Leavenworth, Lyon, Marshall, Meade, Miami, Montgomery, Morris, McPherson, Nemaha, Neosho, Pawnee, Pratt, Rawlins, Sedgwick, Seward, Sumner, Washington, Wilson, Wyandotte, Shawnee, Clark, Comanche, Labette, Barber, Gray, and Marion. On June 1, 1919, Coffey and Allen counties were organized but had not employed agents.

Previous to July 1, 1915, seven of the counties mentioned were each employing a county agricultural agent who devoted his entire time to agricultural demonstration work in the county. This work was supported partly by means of appropriations from the United States Department of Agriculture, partly from appropriations under the federal Smith-Lever act, and partly from farm-bureau membership fees and private subscriptions.

Following the enactment of the farm-bureau law in January, 1915, these counties raised their membership to more than two hundred fifty and complied with the law providing for county appropriations to support farm-bureau work.

In addition thirty-nine other counties have completed farm bureaus and employed agents, making a total of forty-six counties that now (June 1, 1919) have fully organized farm bureaus. The work in these counties is partially supported from county funds.

In every county where a farm bureau has been organized and county-agent work is now conducted, funds are appropriated by the county through the county commissioners, by the State through the Agricultural College, and by the Federal Government through the United States Department of Agriculture, and the work is on a permanent basis.

The additional help furnished to counties in the form of assistant county agents has, during the past year, been discontinued. These men rendered valuable service in relieving county agents of much of the extra work due to the war emergency. However, it was considered that it was more essential that these younger men be used for military service.

EMERGENCY AGENT WORK. Early in April, 1917, Congress initiated legislation to provide an emergency fund for the purpose of extending agricultural-agent work to every county in the United States. This appropriation became available in August, 1917, and during the remainder of that year eleven counties, namely, Johnson, Cowley, Ford, Seward, Stevens, Kingman, Pratt, Finney, Hodgeman, Ness, and Rush, employed agents under that act, and during 1918 Gray county was added to this list. The salary of the agent in each case was paid by the government, and the expenses, not exceeding \$800, by the county. Finney, Ford, Gray, Hodgeman, Seward, Johnson, Kingman and Pratt counties have organized farm bureaus, and in Cowley, Ness, Rush and Stevens counties the work has been discontinued.

Since it was the desire of the Federal Government that agricultural agents be located quickly in every county to assist in meeting the agricultural problems growing out of the war, the policy of placing an emergency agent in districts of two counties each was adopted in the fall of 1917. In these districts the government pays the salary and traveling expenses of the agent, and some coöperating organization pays office expenses.

Under this plan agents were appointed during 1917 in the following thirteen two-county districts: Riley and Geary, Barton and Rice, Elk and Chautauqua, Jackson and Jefferson, Osage and Coffey, Osborne and Mitchell, Pottawatomie and Wabaunsee, Rawlins and Cheyenne, Labette and Neosho, Kearny and Hamilton, Greeley and Wichita, Crawford and Cherokee, Decatur and Sheridan.

During 1918 emergency agents were appointed for the following additional districts comprising the counties of Thomas, Logan, Wallace, and Sherman; Rooks and Graham; Allen and Woodson; and Scott and Lane. District agent work was discontinued in Riley and Geary, Barton and Rice, Jackson and Jefferson, Osborne and Mitchell, Pottawatomie and Wabaunsee, Rawlins and Cheyenne, Labette and Neosho, Crawford and Cherokee, and Decatur and Sheridan counties. In 1919 two new districts were created as follows: Clark and Kiowa; Dickinson, Saline, and Ottawa. In this latter group, Barton, Labette, Clark, Jackson, Jefferson, Rawlins, Cheyenne, Neosho and Cherokee counties made the work permanent by organizing farm bureaus and hiring county agents.

FARM MANAGEMENT DEMONSTRATIONS. Farm-management demonstrations are conducted by a farm-management specialist in coöperation with the agricultural agents. In these demonstrations such records are taken as are essential to the determination of the net profits of the individual farms. These records are classified according to different types of farming, the profits of each type are determined, and individual farm records are compared with the average of all the farm records taken. The results of the study are made known to each farmer interested, in order that he may use the suggestions received in any needed reorganization of his own business. For those who desire it, farm account books are opened and instruction briefly given in keeping simple records. This work was begun in September, 1914, and by January 1, 1919, thirty-one counties had made definite arrangements for farm-management work. The demand for this work was greatly increased by the enactment of the income tax law and the resulting need of business records by which the income might be determined.

Home Economics

MRS. MARY W. MCFARLANE, Director
 MISS RENA FAUBION, Assistant in Institutes
 MRS. HARRIET W. ALLARD, Assistant in Institutes
 _____, Assistant in Institutes
 MISS MINNIE SEQUIST, Specialist in Extension Schools
 MISS LASSIE LANE, Specialist in Extension Schools
 MISS SUSANNA SCHNEMEYER, Specialist in Extension Schools
 MISS GERTRUDE LYNN, Specialist in Extension Schools
 MRS. LAURA I. WINTER, Specialist in Home Nursing
 MISS EULA BUTZERIN,* Specialist in Home Nursing

Instruction in home economics is secured by about 800 women annually at the Agricultural College, and there are many thousand others throughout the State who have had the advantages of resident instruction either in this or some other institution. Large as this number may seem, it is small when compared to the great number of women and girls of the State to whom these courses are not available. To give as much assistance as possible to this vast majority of women is the aim of the Department of Home Economics in Extension, and with this in view, nine women are regularly employed and two others have been employed part time as special assistants during the year. During the past year all extension work in home economics has been conducted with a special reference to home life as influenced by the war. The extension work in home economics is conducted through farm and home institutes, extension schools, special women's meetings, county normal institutes, home-makers' clubs, by judging at fairs, through lectures at chautauquas, and by means of personal correspondence. During the institute season, from October to March, four women spend full time in giving lectures and demonstrations before farm and home institutes and home-makers' clubs conducted in connection with them. From March to September, inclusive, the same specialists assist in women's meetings, in county normal institutes, and in judging at fairs, at chautauquas, and in special extension schools.

* Absent on leave since June 1, 1918.

From May to September, inclusive, two women give their time to community assembly work. For the entire year the remaining four women spend their time in extension schools, and special demonstration meetings.

EXTENSION SCHOOLS IN HOME ECONOMICS

The extension schools in home economics, covering a period of a week in each place and giving definite courses of instruction, enable the women of the State to avail themselves of the opportunities offered by the Agricultural College at their very doors. The sessions of the school are conducted both forenoons and afternoons, each half day being divided into a lecture period of one hour and a demonstration period of one and one-half hours. For any one school two courses from the following list may be selected: Food preparation, home management, home nursing, sewing, canning, dietetics, and home art. The minimum required membership for a school of this kind is twenty, but as many more may become members as the room in which the school is to be held can accommodate. A tuition fee, usually of \$1 per member, is collected by the local committee to be used in defraying the local expenses. Schools in home economics alone are held from March until October, and in connection with extension schools in agriculture, from November until March. During the year 1918-1919 sixty-one schools were held with an average attendance of fifty-six.

Special schools in dressmaking are held on request. These are two weeks in length, lasting from Monday afternoon until the second Friday evening. The dressmaking schools are designed primarily to give general instruction in sewing and special suggestion to members desiring to make their own dresses.

The prevalence of influenza necessitated the holding of special schools in home nursing, which proved one of the most popular forms of extension work.

Emergency Home Demonstration Agent Work

MISS FRANCES L. BROWN, Emergency State Home Demonstration Leader
 MISS MARY W. WARD, Assistant Emergency State Home Demonstration Leader (Resigned Feb. 15, 1919)
 MISS MOLLIE GOLD, Assistant Emergency State Home Demonstration Leader (Appointed March 1, 1919)
 MISS DELLA STROUD, Assistant Emergency State Home Demonstration Leader (Appointed April 15, 1919)
 MISS MARION P. BROUGHTEN, Kansas City, Kan.
 MISS ANNA ALLEN, Independence, Kan. (Resigned Feb. 1, 1919)
 MRS. CARRIE KITTELL, Fort Scott, Kan.
 MISS IRIS LIVINGSTON, Wichita, Kan. (Resigned March 22, 1919)
 MISS ETHEL MARCHBANKS, Pittsburg, Kan.
 MISS MAE MCLEOD, Hutchinson, Kan. (Resigned Feb. 1, 1919)
 MISS ELSIE BAIRD, Anderson County
 MISS AVIS TALCOTT, Atchison County
 MISS EFFIE MAY CARP, Chase County (Resigned March 8, 1919)
 MISS SARA PATTON, Cherokee County
 MRS. SUE HEMPHILL, Clay County (Feb. 1)
 MISS RUTH WOOSTER, Lyon County
 MISS EDNA DANNER, Marshall County
 MISS MAUDE COE, McPherson County
 MISS EDITH HOLMBERG, Morris County
 MISS OLIVIA PEUGH, Nemaha County
 MISS MOLLIE LINDSEY, Ness County
 MISS ELLEN NELSON, Seward County
 MISS IRENE TAYLOR, Shawnee County
 MRS. MARJORIE KIMBALL, Manhattan City and Riley County
 MRS. LETTY HAM BAKER, Stevens County (Resigned Feb. 4, 1919)
 MRS. HELEN ANDERSON, Washington County (Resigned April 1, 1919)
 MISS MAUDE ESTES, Wyandotte County (Resigned Feb. 15, 1919)
 MISS VERA GOFFE, Meade County (Appointed April 15, 1919)
 MISS LUTIE BURKHOLDER, Wichita, Kan. (Appointed April 1, 1919)

Emergency home demonstration agent work was made possible in August, 1917, through the passage of the emergency extension bill by Congress. This bill provided funds for the employment of county and city home demonstration agents. It carried an appropriation providing for the salaries of these agents, but it stipulated that the expenses and office room and equipment should be provided by the county or city in which the home demonstration agent was placed. These expenses were met in this state in each case by a fund of \$400 guaranteed by the city or county at the time the services of a home demonstration agent were requested.

In taking up the work in cities it is considered a public utility, and the expense fund and equipment are provided either by the city commission, the chamber of commerce, or the public schools, separately or together. Representatives of these organizations and other leading organizations in the city are selected to act as an advisory committee. This committee acts in conjunction with the Division of Extension of the Agricultural College in supervising the work of the agent. Wherever it is possible for the agent to use an organization already existing, this is done, but where this is not possible the agent with the aid of her advisory committee builds an organization.

In the counties the work of the home demonstration agent has been started in two different ways. Several agents have been asked for and placed in counties having no farm bureaus but other organizations, such as the council of defense, willing to guarantee the \$400 for expenses, and office equipment. The work was taken up by the council of defense in Ness, Cowley, Stevens and Seward counties. Cowley County discontinued the work July 1, 1918.

In farm-bureau counties, in addition to the conditions already mentioned, it also was necessary to organize the county for the work of the woman agent. A woman was selected in each township as a vice president, and these vice presidents formed a farm-bureau auxiliary with the usual officers. This organization was completed before the home demonstration agent began her work in the county. However, after following this plan for a time it was found that it would be advantageous to defer the organization until the agent had reached the county, and this change was made.

Since the State conference of home demonstration agents, which was held in August, 1918, such farm-bureau counties requesting women agents as have been able to reorganize have reorganized on the basis of an ideal farm bureau. That is, the women are taken into the farm bureau as members having all the rights and privileges accorded to any member, and they become a part of the working organization. In such counties the work of the home demonstration agent is taken up as a part of the regular farm-bureau program.

January 1, 1918, three home demonstration agents had been placed in cities and twelve county home demonstration agents were at work.

During the spring and summer months of 1918 the program for the work of the home demonstration agents was furnished largely by the Federal Food Administration, and the greater part of the agent's time was used in giving public talks and demonstrations concerning the use of the various substitutes. Since the signing of the armistice the use of substitutes has become less imperative and the home demonstration agents have directed their efforts toward bringing their work to a permanent and constructive basis. To this end the women of the counties and cities having these agents have gathered in groups to discuss the needs of their localities, and the agents, with the help of the women of the counties or cities, have been building up a program of work intended to fill these needs. The home demonstration agent develops the projects included in the program, by means of talks and demonstrations in schools and clubs, exhibits at fairs, and by personal visits. In cities and counties where home demonstration agents have been located for a year the results are encouraging.

The following cities in the State have home demonstration agents at this time (January 1, 1919): Kansas City, Independence, Fort Scott, Wichita, Pittsburg, and Hutchinson. County home demonstration agents are at work in Anderson, Atchison, Chase, Cherokee, Lyon, Marshall, McPherson, Morris, Nemaha, Ness, Seward, Shawnee, Stevens, Washington, and Wyandotte counties. The Riley County agent acts also as agent for the city of Manhattan.

Boys' and Girls' Club Work*

OTIS E. HALL, State Club Leader
LOTTIE MILAM, Assistant
L. C. WILLIAMS, Assistant
L. V. RHINE, Assistant
E. H. WIEGAND, Assistant (Resigned May 1, 1919)
MARION MATEER, Assistant (Resigned March 31, 1919)
FLORENCE WHIPPLE, Clerk of Department

Boys' and girls' club work has become a very important phase of extension service. It is divided into club projects, and each project represents some specific farm or home activity, such as corn growing, pig feeding, gardening, canning, sewing, bread baking, etc.

Most of the clubs are conducted in coöperation with farm bureaus, farm and home institute organizations, county boards of education, and business men's organizations. Almost any community, however, can start a club by interesting five or more boys and girls in one of the club projects and by getting pledges from them to carry on the work as outlined by county and State leaders. Through these clubs the College is able to reach and serve a class of young people which it would neither reach nor serve in any other way. A large number of boys and girls get their first acquaintance with the College through the club work. Very few club groups fail to have a representative direct from the College visit them some time during the year. County agents give frequent and valuable help to these young workers. From College specialists, from county agents, and through special letters and lessons sent out from the State leader's office, the boys and girls learn definitely regarding the results of many of the more important experiments conducted by the experiment stations and regarding farm practices recommended by the College. In fact some of the most valuable methods and practices which the College has to offer are put into actual practice by these young people.

In 1918 something like 15,000 boys and girls were enrolled in this phase of extension work. They represented more than 720 club groups. In charge of each group was an adult who was known as the local leader. These local leaders work under the supervision of the county leader, who in many cases is the county club leader, the county agent, or the county superintendent of schools.

Complete records showing expenses and receipts are kept by the boys and girls, and they meet now and then with their local and county leaders to consider various matters pertaining to their different projects. The president of the club in most cases is one of the club's own members. In this way valuable experience in leadership is had by hundreds of boys and girls who have no other source for such experience. At the close of the club season the different club members send in their records and stories, and many of them exhibit at local, county and State contests. In short, the club boys and girls shoulder responsibilities, meet with failure as well as with success, and do on a small scale what they will be obliged to do on a larger scale if they in later years become successful farmers and home-makers.

* The U. S. Department of Agriculture coöperates in furnishing a part of the salary of each one in this department.

Drainage and Irrigation Engineering

CAPT. H. B. WALKER (in Military Service)
J. B. MARCELLUS, Engineer in Charge
IRA E. TAYLOR, Assistant Engineer

With increased value of food products, there is a desire to reclaim any unprofitable acres and to make more sure a profitable crop where irrigation is needed. The eastern part of the State has problems of drainage and flood control. Crops on some of the most fertile valleys are ruined by floods. In many instances this has been prevented by formation of drainage districts which straightened stream channels, removed obstructions, and built levees. Individual farms have also been improved and advanced in value by installing a drainage system. In the development of large areas in the western section of the State, irrigation by pumping is becoming an important agency. With increased knowledge of water sources, an appreciation of the benefits of irrigation by pumping, and intelligent application of the best methods of irrigation, these areas will not be subject to any serious fluctuations of crop yields.

The Agricultural College employs and maintains a drainage and irrigation engineer and assistants for the purpose of giving scientific and practical help to persons or communities interested in field irrigation or land drainage. It is the duty of this engineer to render assistance in the organization and management of drainage districts; to give advice to farmers contemplating farm drainage projects; to advise with individuals or communities interested in irrigation development; to prepare and approve plans, estimates and specifications for drainage and irrigation projects; and to carry on a general campaign of education for the best methods of land reclamation. The services of this engineer are free except for the usual charge for traveling and local expenses.

Rural Service

WALTER BURR, *Director*

The work of the Rural Service Department is now on the project basis, approved by the States Relations Service of the United States Department of Agriculture, under the title "Rural Organization."

The object of this department is to advise with and assist county agents and farm bureaus in coördinating the activities of groups of farmers, community leaders and farmers' organizations for more effective work in the development of the agriculture and home economics of the rural community.

Conferences of leaders are held in local communities for discussion and consultation in regard to the work undertaken by organized groups and to ways in which the efforts of these groups may be coördinated. Suggestions are given by letter and personal visit to individuals and groups contemplating organization, as to what type of organization is best suited

to local needs. Where communities lack unity because of a multitude of unrelated and overlapping organizations, efforts are made through personal visits and correspondence to interest the organizations in co-ordinating their activities through the farm bureau.

Programs for all-round community development in harmony with county farm bureau plans are worked out on the request of community leaders in coöperation with other specialists on the extension staff. One state-wide rural organization conference is conducted each year. At this conference methods of rural organization and community programs are given consideration.

Home-study Service

(Correspondence Study)

V. L. STRICKLAND, Director
 GEORGE GEMMELL, Agronomy
 D. W. ZEIGLER, Animal Husbandry (Resigned May 1, 1919)
 KATHERINE M. BOWER, Home Economics
 H. H. FENTON, Industrial Subjects
 JULIA BAKER ALDER, English and History
 P. P. BRAINARD, Education

NOTE.—The faculty members employed in the Home-study Service devote their entire time to the work of teaching by correspondence. They keep in close touch with the various departments of the College and all credit courses which are offered by correspondence must first meet the requirements of the regular College department handling the courses in residence.

There are many people in Kansas who, for many reasons, cannot attend classes on the campus, although they have interest in and need for the work offered by the Kansas State Agricultural College. Moreover, it has quite generally come to be recognized that even the completion of a college course does not end the necessity for education. It is in recognition of these manifold demands, far greater in number than the resident attendance at the College, that the institution offers to citizens of the State an opportunity to study at home various lines of agriculture, home economics, mechanic arts, farm engineering, and numerous high-school subjects.

The Home-study Service attempts to meet the widely varying needs and conditions of the people of Kansas by offering the following types of service:

1. *Free Reading or Unit Courses*, each of which is a one-lesson treatment, in a simple, brief, and nontechnical way, of a single problem or unit of subject matter for which there is a demand in some phase of practical everyday life. The courses in this list are so numerous and varied that few interests are not touched by them. That they may be readily available and freely used by all to whom they would be helpful, they are made free to residents of the State. For full information concerning Free Reading Courses send for Part I of the Home-study Service Announcement.

2. *Extension or Vocational Courses*, which are complete, comprehensive courses adapted to the needs of those who are ambitious for thorough, scientific training to meet in an effective way the various

practical and technical problems found in the various vocational activities. These afford the nearest possible home equivalent of a college education and offer the particular advantage of utilizing the practical situations of life as their laboratory and shop exercises. For full information concerning the Vocational Courses send for Part II of the Home-study Service Announcement.

3. *Credit Courses*, which are offered for those who for any reason are unable to attend school and wish to do work of a type that can be used for college or high-school credit. These courses are also of value to those who wish to use their time to advantage when school is not in session. For further information concerning Credit Courses, send for Part III of the Home-study Service Announcement.

4. *Special Courses for Teachers*, which are a series designed as helps for teachers of industrial, agricultural and home economic subjects. A particular effort is made in these courses to make available to the teachers of the State all the materials and aids which the Kansas State Agricultural College can offer them.

5. *Emergency Courses*. During the war a number of these courses were offered to help meet the new difficulties and duties imposed. It is the purpose of the department to continue a service of this kind. Whenever new situations arise calling for such courses, requests for them will be appreciated.

6. *Study Centers*. Under regulations established for this purpose, study centers may be arranged where college subjects may be studied under the personal direction of members of the College faculty.

7. *Information Service*, the purpose of which is to afford a definite source to which technical or informational questions may be referred. All such questions which are referred to the Home-study Service will be promptly answered if possible, or referred to a specialist in the College or elsewhere, who will supply the information desired.

8. *Lantern-slide Service*. A number of sets of lantern slides on agricultural, industrial and economic subjects have been prepared by specialists in the College with particular reference to Kansas conditions. These will be loaned, free of cost (except transportation charges), to any responsible resident of Kansas. For further information concerning these, inquiries should be addressed to the Home-study Service of the College.

Free Reading Courses

The following Free Reading Courses are now in circulation. Others will be added as need arises and materials become available. These courses, including the bulletins and other publications containing the subject matter, are *free to residents of Kansas*, not because it costs nothing to offer them, but because it is felt that the service is due without direct charge to those who can use it to advantage, just as are many other services from state-supported institutions.

AGRICULTURAL READING COURSES

<i>Soils and Fertility</i> (Including related subjects)		RA 210. Asparagus and Its Culture
RA 1. Soil Fertility		RA 211. Celery and Its Culture
RA 2. Land Drainage		RA 212. Popcorn and Its Culture
RA 3. Humus		RA 213. The Small Vegetable Garden
RA 4. Barnyard Manure		RA 214. Increasing The Potato Yield by Spraying
RA 5. Green Manuring		RA 215. Potato Storage
RA 6. Commercial Fertilizers		
<i>Farm Crops</i> (Including related subjects)		<i>Orchard Crops</i> (Including related subjects)
RA 101. Growing corn in Kansas		RA 301. The Apple and Its Culture
RA 102. Seed Selection for Crop Improve- ment		RA 302. Apple Orchard Management
RA 103. Wheat and Its Culture		RA 303. Pruning
RA 104. Wheat in Western Kansas		RA 304. Insect and Fungous Enemies of the Apple
RA 105. Preparing the Land for Wheat		RA 305. The Peach and Its Culture
RA 106. Oats and Their Culture		RA 306. Spraying Peaches
RA 107. Barley and Its Culture		RA 307. The Pear and Its Culture
RA 108. Grain Smuts		
RA 109. Growing Sorghum in Kansas		<i>Small Fruits</i> (Including related subjects)
RA 110. Feterita and Its Culture		RA 401. The Home Fruit Garden
RA 111. Milo and Its Culture		RA 402. Plant Propagation
RA 112. Sweet Sorghums and Their Culture		RA 403. Strawberries and Their Culture
RA 113. Sorghum Sirup Manufacture		RA 404. Raspberries and Their Culture
RA 114. Sudan Grass and Its Culture		RA 405. Grapes and Their Culture
RA 115. Broom Corn and Its Culture		RA 406. Grape Diseases and Pests
RA 116. Corn Growing Under Droughty Conditions		RA 407. Orchard Spraying
RA 117. Meadow and Pasture Grasses		RA 408. Growing Cherries East of the Rocky Mountains
RA 118. Rape and Its Culture		RA 409. Blackberry Culture
RA 119. Peanuts and Their Culture		
RA 120. Cowpeas and Their Culture		<i>Ornamental Plants</i> (Including related subjects)
RA 121. Soy Beans and Their Culture		RA 501. Annual Flowers
RA 122. Alfalfa and Its Culture		RA 502. Lawns
RA 123. Red Clover and Its Culture		RA 503. Beautifying the Home Grounds
RA 124. Sweet Clover and Its Culture		RA 504. Tree Culture
		RA 505. Trees for Western Kansas
<i>Garden Crops</i> (Including related subjects)		RA 506. Black Walnuts
RA 201. The Home Vegetable Garden		RA 507. The Hardy Catalpa
RA 202. The Potato and Its Culture		
RA 203. Potato Diseases		<i>Farm Animals</i> (Including related subjects)
RA 204. Sweet Potatoes and Their Culture		RA 601. Breeds of Draft Horses
RA 205. Tomatoes and Their Culture		RA 602. Breeds of Light Horses
RA 206. Cabbage and Its Culture		RA 603. Feeding Work Horses
RA 207. Diseases of Cabbage and Cauliflower		RA 604. Unsoundness in Horses
RA 208. The Onion and Its Culture		RA 605. Navel Ill
RA 209. Cucumbers and Their Culture		RA 606. Blind Staggers

FREE READING COURSES—AGRICULTURE—*Continued*

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|---|---|
| RA 607. Breaking and Training Colts | RA 683. Utilizing Farm Wastes in Feeding Livestock |
| RA 608. Horse-Breeding Suggestions for Farmers | RA 691. Some Common Disinfectants |
| RA 609. Growing Draft Colts | RA 692. Disinfection of Stables |
| RA 611. Breeds of Beef Cattle | RA 693. Screw-worms and Other Maggots Affecting Animals |
| RA 612. Feeding Cattle | RA 694. Tuberculosis |
| RA 613. Production of Baby Beef | RA 695. Foot-and-Mouth Disease. |
| RA 614. Cottonseed Meal for Feeding Beef Cattle | |
| RA 615. Dehorning and Castrating Cattle | <i>Insects</i> |
| RA 616. Actinomycosis or Lumpy Jaw | (Including related subjects) |
| RA 617. Contagious Abortion of Cattle | RA 701. The Chinch Bug |
| RA 621. Breeds of Dairy Cattle | RA 702. The Hessian Fly |
| RA 622. Dairy Farming | RA 703. Insect Pests of Alfalfa |
| RA 623. How to Raise Calves on Skim Milk | RA 704. The Spring Cankerworm |
| RA 624. Production of Clean Milk | RA 705. Insects Injurious to Stored Grains |
| RA 625. Feeding Dairy Cows | RA 706. The White Grub |
| RA 631. Breeds of Sheep | RA 707. The Stable Fly |
| RA 632. Sheep Raising | RA 708. The Honey Bee |
| RA 641. Breeds of Swine | RA 709. Comb Honey Production |
| RA 642. Hog Feeding | RA 710. Treatment of Bee Diseases |
| RA 643. Self-feeders for Swine | RA 711. Outdoor Wintering of Bees |
| RA 644. Feeding and Growing of Swine | RA 712. Transferring Bees to Modern Hives |
| RA 645. Hogging down Crops | RA 713. White Ants |
| RA 646. Swine Management | RA 714. Important Insecticides |
| RA 647. Hog Cholera | RA 715. How to Detect Insect Outbreaks |
| RA 651. Breeds of Poultry | RA 716. Methods of Controlling Grass-hoppers |
| RA 652. Poultry Management | RA 717. Collection and Preservation of Insects |
| RA 653. Capons and Caponizing | |
| RA 654. Incubation of Eggs | <i>Agricultural Economics and Sociology</i> |
| RA 655. Brooding of Chickens | RA 801. How to Use Farm Credit |
| RA 656. Backyard Poultry Keeping | RA 802. The Farmer's Living |
| RA 657. Mites and Lice on Poultry | RA 803. Community Welfare |
| RA 658. Important Poultry Diseases | RA 804. Coöperative Livestock Shipping Associations |
| RA 659. Turkey Raising | RA 805. Farm Accounts |
| RA 660. Duck Raising | |
| RA 661. Goose Raising | <i>Miscellaneous Agricultural Subjects</i> |
| RA 662. The Guinea Fowl | RA 901. Bindweed |
| RA 663. Squab Raising | RA 902. Canada Thistles |
| RA 671. Meat on the Farm | RA 903. Some Useful Birds |
| RA 672. Killing Hogs and Curing Pork | RA 904. The Pocket Gopher |
| RA 681. Making and Feeding Silage | RA 905. How to Destroy Rats |
| RA 682. Feeding Grain Sorghums to Livestock | RA 906. Weeds: How to Control Them |

INDUSTRIAL READING COURSES

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|---|---|
| <i>Farm Machinery</i> | RI 103. Horseshoeing |
| RI 1. Gasoline Engines | RI 104. Rope Work |
| RI 2. Corn Cultivators | |
| RI 3. Corn Harvesting Machinery | <i>Storage of Perishable Farm Produce</i> |
| RI 4. Care and Repair of Plows and Harrows | RI 201. Sweet Potato Storage |
| RI 5. Care and Repair of Mowers, Reapers, and Binders | RI 202. Root Crops |
| RI 6. Operation of Threshing Machines | RI 203. Potato Storage |
| RI 7. Farm Tractor | |
| <i>Farm Shop</i> | <i>Farm Concrete Work</i> |
| RI 101. Repair of Farm Equipment | RI 301. Cement, Mortar, and Concrete |
| RI 102. The Use of Paint | RI 302. Use of Concrete on the Farm |
| | RI 303. Concrete Silo Construction |
| | RI 304. Concrete Fence Posts |
| | RI 305. Underground Silos |

FREE READING COURSES—INDUSTRIAL—*Continued*

<i>Roads in the Country</i>		RI 603. The Farm Home
RI 401. Benefits of Improved Roads		RI 604. Ice Houses
RI 402. Sand, Clay and Burnt Clay Roads		RI 605. Poultry Houses
RI 403. The Road Drag and How to Use It		RI 606. Hog Houses
RI 404. Macadam Roads		RI 607. Ventilation of Stables
RI 405. Highway Improvement		RI 608. Care of Farm Buildings
<i>Drainage and Irrigation</i>		RI 609. Silo Construction
RI 501. Information for Beginners		RI 610. Pit Silo
RI 502. The Construction of Small Irriga- tion Ditches		RI 611. Sanitary Privy
<i>Farm Buildings</i>		<i>Miscellaneous Industrial Subjects</i>
RI 503. Gardens		RI 701. Farm Wood Lot
RI 504. Orchards		RI 702. Farm Water-supply Systems
RI 505. Grain Fields		RI 705. Fire Prevention
RI 506. Sugar Beets		RI 706. Farm Lighting
RI 507. Alfalfa		RI 707. Preservative Treatment of Farm Timbers
RI 508. Drainage of Irrigated Lands		RI 708. Home Conveniences
RI 509. Windmills in Irrigation		RI 709. Plumbing for Farm Kitchens
RI 510. Tile Drainage on the Farm		RI 710. Lightning and Lightning Con- ductors
RI 511. Land Drainage		RI 711. Ice-box Construction
RI 512. Farm Reservoirs		RI 712. Trap Nest Construction
RI 513. Pumping for Irrigation		RI 713. Fly Trap Construction
		RI 714. Hoppers for Poultry Feeding
		RI 715. Bird House Construction

HOME ECONOMICS READING COURSES

<i>Foods and Nutrition</i>		<i>Carbohydrates or Starches and Sugars</i>	
RHE 1. Nutrition		RHE 301. Sugar as Food	
RHE 2. How to Select Foods I: What the Body Needs		RHE 302. Maple Sugar	
RHE 3. How to Select Foods II: Cereal Foods		RHE 303. Sorghum Sirup	
RHE 4. How to Select Foods III: Foods Rich in Protein		RHE 304. Use of Honey	
<i>Preparation of Foods</i>		RHE 305. Root Crops as Food	
RHE 101. Bread		RHE 306. The Native Persimmon	
RHE 102. Cheese		RHE 307. Fruit as Food	
RHE 103. Butter		RHE 308. Okra	
RHE 104. Vegetables		RHE 309. The Dasheen	
RHE 105. Food for Young Children		RHE 310. Sugar Beet Sirup	
RHE 106. School Lunches		RHE 311. Common Edible Mushrooms	
RHE 107. Home Made Fireless Cookers		<i>Cereals</i>	
RHE 108. Fresh Fruits and Vegetables as Conservers of Staple Foods		RHE 401. Food Value of Corn, Kafir, and Cowpeas	
<i>Proteins</i>		RHE 402. Ways of Using Cornmeal	
RHE 201. Milk		RHE 403. Popcorn	
RHE 203. Legumes		RHE 404. Corn as Food	
RHE 204. Nuts		RHE 405. Breakfast Foods	
RHE 205. Meats		<i>Preservation of Foods</i>	
RHE 206. Fish		RHE 501. Home Care of Foods	
RHE 207. Mutton		RHE 502. Milk	
RHE 208. Economy in the Use of Meat		RHE 503. Milk and Its Bacterial Content	
RHE 209. Poultry as Food		RHE 504. Vegetable Canning	
RHE 210. How to make Cottage Cheese on the Farm		RHE 505. Tomato Canning	
RHE 211. The Guinea Fowl as Food		RHE 506. Peach Canning	
		RHE 507. Grape Juice	
		RHE 508. Preserving Apples by Evapora- tion	
		RHE 509. Fruits and Jellies	

FREE READING COURSES—HOME ECONOMICS—*Continued*

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| RHE 510. Home Uses for Muscadine Grapes | RHE 608. House Flies |
| RHE 511. Canning Instructions | RHE 609. House Ants |
| RHE 512. Drying Fruits and Vegetables in the Home | RHE 610. Silverfish |
| RHE 513. Preservation of Vegetables by Fermentation and Salting | RHE 611. Harvest Mites, or Chiggers |
| RHE 514. Home-made Fruit Butters | RHE 612. The Bedbug |
| | <i>Fats and Oils</i> |
| | RHE 701. Economical Uses of Fat |
| | RHE 702. Peanut Oil |
| | <i>Household Pests</i> |
| RHE 601. Mosquitoes | |
| RHE 602. Fleas and Their Control | |
| RHE 603. Carpet Beetle | |
| RHE 604. House Centipede | |
| RHE 605. Cockroaches | |
| RHE 606. Moths | |
| RHE 607. Insects and Their Effect on Health | |
| | <i>Household Management</i> |
| | RHE 801. The Farm Kitchen as Workshop |
| | RHE 802. Removal of Stains |
| | RHE 803. Farm House Conveniences |
| | RHE 804. Farm Household Accounts |
| | RHE 805. Steam Pressure for Home Cooking |

READING COURSES IN EDUCATION

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| RE 1. Needed Changes in Secondary Education | RE 18. Practice Teaching in Normal Training High Schools |
| RE 2. Vocational Secondary Education | RE 19. Training Rural Teachers |
| RE 3. Open Air Schools | RE 20. Training for Foreign Service |
| RE 4. Washington State Educational Institutions | RE 21. The High School Library |
| RE 5. Social Studies for the High School | RE 22. Summer Sessions of City Schools |
| RE 6. Education in Wyoming | RE 23. Music in the High School |
| RE 7. Corporation Schools | RE 24. Physical Education in the High School |
| RE 8. The Coöperative System of Education | RE 25. Moral Values in Education |
| RE 9. School Gardens | RE 26. Training in Courtesy |
| RE 10. Agricultural Education in Ireland | RE 27. Public School Classes for Crippled Children |
| RE 11. Rural School Supervision | RE 28. The Community Center |
| RE 12. Agricultural Education in Russian Secondary Schools | RE 29. Land Grant Colleges |
| RE 13. City School Administration | RE 30. Vocational Guidance in Secondary Education |
| RE 14. Department Store Education | RE 31. Vocational Guidance and the Public Schools |
| RE 15. The University of Nevada | RE 32. Primary Education |
| RE 16. The Money Value of Education | RE 33. Modern Demands upon the School |
| RE 17. Military Training in Schools | |

Vocational Courses

The following Vocational Courses are based on standard textbooks. Each subject consists of from sixteen to twenty assignments.

A period of twelve months from date of enrollment is allowed in which to complete a subject. A fee of \$3 per subject is charged for residents of Kansas; for nonresidents the fee is \$6. Full details are to be found in Home-study Service Bulletin, Part II.

AGRICULTURAL COURSES

Agronomy

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 3. Soils
4. EA 4. Farm Crops
5. EA 5. Forage Crops

(Select three additional subjects from list of electives.)

Horticulture

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 3. Soils
4. EA 6. Gardening
5. EA 7. Orchardring

(Select three additional subjects from list of electives.)

Animal Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry

3. EA 8. Feeds and Feeding

4. EA 9. Animal Breeding

5. EA 10. Types and Breeds

(Select three additional subjects from list of electives.)

Dairying

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 8. Feeds and Feeding
4. EA 11. Farm Dairying
5. EA 9. Animal Breeding

(Select three additional subjects from list of electives.)

Poultry Husbandry

Required subjects:

1. EA 1. Essentials of Agriculture
2. EA 2. Elementary Agricultural Chemistry
3. EA 8. Feeds and Feeding
4. EA 12. Poultry Production
5. EA 9. Animal Breeding

(Select three additional subjects from list of electives.)

LIST OF ELECTIVE SUBJECTS APPLYING TO THE AGRICULTURAL COURSES

EA 9. Animal Breeding

EA 26. Beef Production

EA 4. Cereal Crops

EA 21. Dairy Manufacturing

EA 22. Diseases of Animals

EA 25. Dry-land Farming

EA 11. Farm Dairying

EA 19. Farm Forestry

EA 8. Feeds and Feeding

EA 17. Floriculture

EA 5. Forage Crops

EA 16. Greenhouse Management

EA 24. Horse Production

EA 27. Hog Raising

EA 13. Insects Injurious to Farm Crops

EA 15. Insects Injurious to Garden Crops

EA 14. Insects Injurious to Orchard Crops

EA 18. Landscape Gardening

EA 6. Gardening

EA 7. Orchardring

EA 12. Poultry Production

EA 28. Sheep Feeding

EA 29. Sheep Raising

EA 20. Tree Surgery

EA 3. Soils

EA 10. Types and Breeds

EA 30. Bee Keeping

EA 31. Farm Management

By special arrangement with this department students may choose from other lists of electives described hereafter.

INDUSTRIAL COURSES

Carpentry and Building

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 3. Architectural Drawing
4. EI 4. Constructive Carpentry and Inside Finishing
5. EI 5 Heating and Ventilating

(Select three additional subjects from list of electives.)

Farm Engineering

Required subjects:

1. EI 6. Farm Drainage
2. EI 7. Farm Buildings
3. EI 8. Concrete Construction
4. EI 9. Farm Blacksmithing
5. EI 10. Farm Machinery

(Select three additional subjects from list of electives.)

VOCATIONAL COURSES—INDUSTRIAL—*Continued**Stationary Engineering*

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 11. Steam Boilers and Engines
4. EI 12. Gasoline Engines
5. EI 13. Blacksmithing

(Select three additional subjects from list of electives.)

Highway Improvement I

Required subjects:

1. EI 15. Highway Construction
2. EI 8. Concrete Construction
3. EI 19. Bridge and Culvert Construction
4. EI 16. Roads and Pavements
5. EI 28. Strength of Materials

(Select three additional subjects from list of electives.)

Highway Improvement II

Required subjects:

1. EI 14. Plane Surveying
2. EI 16. Roads and Pavements
3. EI 28. Strength of Materials
4. EI 2. Mechanical Drawing, Applied
5. EI 30. Structural Engineering

(Select three additional subjects from list of electives.)

Machine Shop and General Repairing

Required subjects:

1. EI 1. Shop Mathematics
2. EI 2. Mechanical Drawing, Applied
3. EI 17. Automobiles
4. EI 13. Blacksmithing
5. EI 18. Machine Shop Work

(Select three additional subjects from list of electives.)

LIST OF ELECTIVE SUBJECTS APPLYING TO THE INDUSTRIAL COURSES

EI 3. Architectural Drawing
 EI 17. Automobiles
 EI 13. Blacksmithing
 EI 19. Bridge and Culvert Construction
 EI 4. Constructive Carpentry and Inside Finishing
 EI 8. Concrete Construction
 EI 20. Elementary Woodworking
 EI 9. Farm Blacksmithing
 EI 7. Farm Buildings
 EI 6. Farm Drainage
 EI 10. Farm Machinery
 EI 21. Farm Woodworking
 EI 22. Foundry Practice
 EI 12. Gasoline Engines
 EI 23. Gasoline and Oil Traction Engines

EI 15. Highway Construction
 EI 5. Heating and Ventilating
 EI 18. Machine Shop Work
 EI 2. Mechanical Drawing, Applied
 EI 24. Pattern Making
 EI 14. Plane Surveying
 EI 25. Plumbing
 EI 26. Practical Electricity
 EI 16. Roads and Pavements
 EI 27. Sheet Metal Drafting
 EI 1. Shop Mathematics
 EI 28. Strength of Materials
 EI 11. Steam Boilers and Engines
 EI 29. Steam Traction Engines
 EI 30. Structural Engineering

By special arrangement with this department students may choose from other lists of electives set forth in this pamphlet.

COURSES IN HOME ECONOMICS

Domestic Science

Required subjects:

1. EH 1. Household Management
2. EH 2. Foods and Cookery I
3. EH 3. Foods and Cookery II
4. EH 9. Home Nursing
5. EH 10. Home Sanitation

(Select three additional subjects from list of electives.)

Domestic Art

Required subjects:

1. EH 1. Household Management
2. EH 5. Sewing I
3. EH 6. Sewing II

4. EH 11. Home Decoration

5. EH 8. Educative Millinery

(Select three additional subjects from list of electives.)

General Course in Home Economics

Required subjects:

1. EH 1. Household Management
2. EH 2. Foods and Cookery I
3. EH 9. Home Nursing
4. EH 5. Sewing I
5. EH 11. Home Decoration

(Select three additional subjects from list of electives.)

LIST OF ELECTIVE SUBJECTS APPLYING TO THE HOME ECONOMICS COURSES

EH 2. Foods and Cookery I	EH 11. Home Decoration
EH 3. Foods and Cookery II	EH 12. Personal Hygiene
EH 4. Foods and Cookery III	EH 13. Household Bacteriology
EH 5. Elementary Sewing	EH 14. Child Life and Care of Children
EH 6. Sewing I	EH 15. Household Chemistry
EH 7. Sewing II	EH 16. Costume Design
EH 8. Educative Millinery	EH 17. Laundering
EH 9. Home Nursing	EH 18. Dressmaking
EH 10. Home Sanitation	EH 19. Dietetics

Credit Courses

GRADES OF WORK. Credit courses are offered in both high-school, or entrance credit subjects, and college subjects. The courses in each case are the full equivalent of resident courses in like subjects.

BY WHOM CONDUCTED. The courses are prepared under the supervision of the heads of departments of the Agricultural College faculty and are taught by specialists in correspondence study under the same regulations that govern resident work.

EXAMINATIONS. Examinations may be taken at the College or under conditions approved by the College. In the latter case arrangements can often be made with the local county superintendent or superintendent of schools to conduct the examination.

REGULATIONS. 1. Enrollments for correspondence-study work will be received at any time during the year, and students may continue their work uninterrupted throughout the entire year.

2. Correspondence students will be expected to complete any course for which they are enrolled within twelve months from the date of enrollment.

3. Not more than two courses may be carried through correspondence at any one time. It is recommended that a student carry but one subject at a time.

4. Each subject listed under the various departments constitutes what is known as a correspondence "course."

5. Students enrolling for correspondence courses must meet the prerequisites the same as if undertaking the work in residence.

6. A student may not be enrolled for correspondence work while in attendance at any institution of learning without special permission from the Dean or proper authorities in the institution of which he is a student.

FEES. An enrollment fee of \$10 a year is charged for residents of Kansas; \$15 for nonresidents. For this amount the student is entitled to tuition for twelve months, during which period he may carry two courses at a time. No fee is refunded because of the student's inability to enter upon the course for which once registered. Extensions of time can be granted only where the work has been delayed because of personal illness of the student. All such cases must be taken up individually with the director of this Department.

BOOKS AND STATIONERY. Students will be expected to provide all textbooks, drawing outfits, stationery and other materials required in their courses, also to pay postage on lessons one way.

FOR WHOM INTENDED

Though credit courses offered by the Home-study Service are still limited, the number is steadily growing, and it is the purpose of the Department to add courses whenever a demand for them becomes evident. The other types of work are sufficiently broad to be of value to a great variety of people. The following classes in particular should be able to profit by them:

1. Those who have completed a common-school course but for any reason are unable to attend high school.
2. High-school graduates temporarily or permanently unable to attend college.
3. Students whose attendance at high school or college has been interrupted.
4. Students who for any reason have fallen behind in their work and wish to use their spare time catching up.
5. The strong, aggressive student who does not wish to halt his progress for vacations and other interruptions.
6. High-school and grade classes in practical courses that need supplementing and enrichment.
7. Teachers who wish further professional or other training, or who need help in planning and conducting their work.
8. Professional and business men who wish to keep growing along some line of interest, professional or avocational.
9. Clubs and other organizations which wish to make systematic studies.
10. Men and women who wish effective help in meeting the demands in their vocations for technical and scientific knowledge and training.

COURSES OF INSTRUCTION

The list of Credit Courses offered is being extended constantly, the new courses added in each case being those for which there seems to be the most demand. The following is the present list:

High School Courses

<i>Agriculture</i>		Units credit.	Assign- ments.
PCA 1.	Elementary Agriculture I.....	½	20
PCA 2.	Elementary Agriculture II.....	½	20
<i>Drawing</i>			
*PCD 1.	Free-hand Drawing	½	20
*PCD 2.	Geometrical Drawing	½	20
PCD 3.	Mechanical Drawing I.....	½	20
PCD 4.	Mechanical Drawing II.....	½	20

* In preparation.

<i>English</i>		Units credit.	Assignments.
PCE 1.	Grammar and Composition.....	1½	20
PCE 2.	Literature	1½	20
PCE 3.	Composition	1½	20
PCE 4.	Literature	1½	20
PCE 5.	Composition	1½	20
PCE 6.	Literature	1½	20
<i>Mathematics</i>			
PCM 1.	Algebra I.....	1½	20
PCM 2.	Algebra II.....	1½	20
PCM 3.	Algebra III.....	1½	20
PCM 4.	Plane Geometry I.....	1½	20
PCM 5.	Plane Geometry II.....	1½	20
PCM 6.	Solid Geometry	1½	20
<i>History</i>			
*PCH 1.	Ancient History	1	40
*PCH 2.	Medieval History	1½	20
*PCH 3.	Modern History	1½	20
*PCH 4.	American History	1	40

COLLEGE CREDIT COURSES

DIVISION OF AGRICULTURE

<i>Agronomy</i>		Semester credits.	Assignments.
CA 3.	Grain Crop Production.....	2	20
CA 4.	Forage Crop Production.....	2	20
<i>Animal Husbandry</i>			
CL 1.	Types and Classes of Livestock.....	1	8
CL 2.	History of Breeds.....	2	16
CL 3.	Principles of Feeding.....	3	24
<i>Horticulture</i>			
CH 1.	Small Fruits	2	16
CH 2.	Gardening	3	24
CH 3.	Floriculture	2	16
CH 4.	Green-house Construction and Management.....	3	24
CF 1.	Farm Forestry	3	24
<i>Poultry Husbandry</i>			
CPP 1.	Farm Poultry Production	1	8

DIVISION OF ENGINEERING

<i>Applied Mechanics</i>			
CE 5.	Concrete Construction	1	8
CE 2.	Mechanical Drawing I.....	2	16
CE 6.	Mechanical Drawing II.....	3	24
CE 4.	Kinematics	3	24
<i>Civil Engineering</i>			
CE 1.	Highway Engineering I.....	2	16
<i>Shop Practice</i>			
CE 7.	Metallurgy	2	16

* In preparation.

<i>Steam and Gas Engineering</i>		Semester credits.	Assignments.
CE 3. Farm Motors	2	16	
CE 8. Heating and Ventilation A.....	2	16	
CE 9. Airplane Mechanics	1	18	
DIVISION OF HOME ECONOMICS			
<i>Domestic Art</i>			
CHE 1. Textiles	2	16	
<i>Domestic Science</i>			
CHE 2. Foods I.....	1	8	
DIVISION OF GENERAL SCIENCE			
<i>Economics and Sociology</i>			
CEC 1. Economics	3	24	
CEC 2. Agricultural Economics	3	24	
CS 2. Rural Sociology	3	24	
CS 3. Sociology	3	24	
<i>Education (Professional)</i>			
CP 8. Psychology	3	24	
CP 7. Educational Administration	3	24	
CP 2. Educational Psychology	3	24	
CP 4. History of Education	3	24	
CP 3. Educational Sociology	3	24	
CP 12. Home Economics Education	2	16	
CP 11. Agricultural Education	2	16	
CP 1. Industrial	3	24	
CP 5. Principles of Education	3	24	
CP 6. Methods of Teaching	3	24	
CP 9. School Discipline	2	24	
CP 10. Rural Education	3	24	
<i>English</i>			
CCE 1. College Rhetoric I.....	3	24	
CCE 2. College Rhetoric II.....	3	24	
CCE 3. Business English	3	24	
CCE 4. The Short Story	3	24	
<i>Geology</i>			
CG 1. Dynamic Geology	2	16	
<i>Mathematics</i>			
CM 7. Plane Trigonometry	3	25	

Student Organizations

THE STUDENT COUNCIL

The student council is a representative body which was organized by the students in 1909 and received official sanction from the Board of Regents and the faculty of the College. Its objects are: "(1) To act as a representative body before governing officers of the College in all matters that concern the individual students, student organizations, or the student body as a whole; (2) to act as a body of mediation between different student organizations or enterprises whenever such service is sought by such organizations or enterprises; (3) to take cognizance of all matters that pertain to the good name and scholarship of the student body, to the end that high standards of honor on the campus and elsewhere may be maintained."

This student council consists of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the School of Agriculture elects a delegate, who has the privilege of speaking on subjects pertaining to his school, but has no vote. At each meeting of the council a member of the College faculty may also be present to participate in the discussions. The members of the council are elected each term, but at each election at least two of the representatives of the senior class and one of those of the junior class must be reelected.

The student council occupies an interesting and valuable place in the College life, and as a whole may be said to be an unqualified success in establishing a system of representative government among the students touching affairs peculiarly their own, and also in matters involving the faculty. All acts of the council are submitted to the President of the College, and if they concern the rules, regulations or ordinances of the College, are subject to approval by the proper governing body. The council is especially helpful in maintaining a high standard of honor among the students in both individual and organized relations. As a means of securing a better understanding in matters likely to cause friction between the student body and the faculty, the council performs a most important function.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and efficient influence among the students in many directions.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, committee rooms, students' living rooms, gymnasium, etc. All young men are welcome to make use of the privileges of the building, whether members or not. No fixed fees for membership are charged, each member giving whatever he feels able to afford. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Home Economics Hall is the headquarters of the association, to which all young women of the College are at all times cordially welcome. An office for the general secretary and rest rooms for the young women are maintained in this building during the college year.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. At the opening of the college semesters the incoming trains are met by "Big Sisters," who assist new women students, the "Little Sisters," in securing suitable lodging and boarding places. If any prospective woman student will write to the general secretary of the association, her "Big Sister" will correspond with her during the summer vacation.

During the college year various social functions are held for the young women. The first of these is an informal reception to enable the College girls to become acquainted with one another. Once each year the two associations entertain jointly.

The religious life of the young women is fostered by the weekly vesper services in the Home Economics Hall. The different churches of the city extend a cordial welcome to the College women, and through the efforts of the association they are encouraged to active participation in the services of the church of their choice.

THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds a social meeting every other Friday evening, and on the alternate Friday evenings the time is devoted to some line of religious study under the direction of the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when properly certified. In further recognition of the club's efforts the College has placed a set of the new Catholic Encyclopedia on its library shelves. Furthermore, the club has purchased and placed in the College library nearly one hundred dollars' worth of Catholic books and pamphlets.

The club is now on a sound basis and is qualifying for affiliation with a national organization of Newman clubs of the various state universities and colleges. Its aim is to favorably influence new Catholic students in the knowledge and practice of their faith, to foster sound morality and good character.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin literary societies are open to both sexes; the Ionian, Eurodelphian and Browning societies admit only young women to membership; the Webster, Hamilton and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council which coöperates with a faculty committee in arranging for all intercollegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety oratorical contest.

In the School of Agriculture there are two literary societies; one for young men, the Lincoln, and one for young women, the Philomathian. These societies have the same general aims and purposes as those in the College.

AGRICULTURAL SOCIETIES

The Saddle and Sirloin Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the State. Livestock problems of all kinds are taken up, and members of the faculty and outside speakers are secured for addresses on special topics. The College section of the American Society of Agronomy meets on call of the president of the society. The membership includes students and instructors interested in agronomy and in allied subjects. The purpose of the society is to promote the development of agronomic work and methods, in harmony with the purpose of the organization of this name. The Agricultural Association meets Monday evenings. All students interested in

agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and State.

ENGINEERING SOCIETIES

The various technical societies of the Division of Engineering meet individually biweekly in departmental seminars for lectures, presentation of papers, and discussion of notable articles appearing in the technical press or in the journals of the national societies. On alternate weeks all of the societies meet together as the Engineers' Association in a general seminar for lectures by eminent practicing engineers and members of the engineering faculty of this and other schools.

The students in mechanical and electrical engineering are organized as student branches of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers, respectively.

The purpose of these various societies is to acquaint the students with the latest development in the fields of engineering and architecture, to give them more definite ideas as to the opportunities in their professions and the requirements for success in their profession, to promote acquaintance and fellowship among the students, and to further the interest of the Division of Engineering in the College and the State.

THE COLLEGE BAND

The College Band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The Band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The Orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the Orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the Orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the gymnasium the College is prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall football teams are

organized; in the fall and winter basketball; while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity with young men for general physical training. In the gymnasium, under a physical director, they receive training suitable for their needs. Basketball and tennis teams are organized among the young women.

HONORARY ORGANIZATIONS

The honorary organizations consist of fraternities, sororities, and societies. Of these, Alpha Zeta and Gamma Sigma Delta draw their members from students in the Division of Agriculture; Alpha Psi draws its members from the Veterinary Department; Sigma Tau from the Division of Engineering; Omicron Nu from the Division of Home Economics. There are chapters of Sigma Delta Chi and Theta Sigma Phi, journalistic fraternities; of Pi Kappa Delta, the debating fraternity; of Zeta Kappa Psi, the debating sorority. The military students have a chapter of "Scabbard and Blade," the national fraternity; and the athletic men have the "K" fraternity. Of honorary societies there are the Quill Club, composed of those who have gained distinction in writing, and the "Forum," for those who have secured forensic honors.

In addition to these student organizations there is a chapter of Phi Kappa Phi, to which students of the highest scholarship are elected. (See "Honor Societies.")

School of Agriculture

(The Secondary School)

HARRY LLEWELLYN KENT, *Principal*

J. W. ZAHNLEY, *Acting Principal*

The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the State. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction yet who feel the necessity of a practical training for their activities in life. A large part of the student's time in the School will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in several terms of English for each course and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

THE COURSE OF STUDY

The curriculum in agriculture emphasizes the growing of crops and the raising of livestock. A minimum of theory and a maximum of practical work bring the student into close contact with the actual conditions of farm life.

The curriculum in domestic science emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

The curriculum in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

ADMISSION

Students who are fourteen years of age or older and who have completed the eighth grade of the public schools are admitted without examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Whenever there is a question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

The Principal of the School of Agriculture is charged with the execution of all College and faculty rules relating to the enrollment of students in classes and their choice of studies. Students entering under the age of seventeen years are required to complete one of the three-year curricula as outlined before they may choose work not included in the curriculum.

It is greatly to the advantage of the prospective student to see to it that his certificate showing work done in grammar school or high school be sent to the College as soon as possible after his work done there is finished. A permit to register will then be sent him by the Registrar in advance of his coming in September; this will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium and will not be compelled to wait his turn to meet the committee on admission.

Upon registration each student receives a certificate of his standing, which he presents to the Principal of the School, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

GRADES AND FAILURES

Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, severs a student's connection with the institution, which connection can be renewed only through the action of the Principal of the School. Any withdrawals from school or class must be authorized by the Principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term if they so desire.

Curriculum in Agriculture

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
Stock Judging	Fruit Growing
An. Husb. 51..... 3(0-6)	Hort. 51 3(2-2)
Beginning Poultry	Blacksmithing I
Poult. Husb. 51..... 2(1-2)	Shop 69 2(0-4)
Carpentry I	Farm Gas Engines I
Shop 51 2(0-4)	Farm Engr. 75..... 2(1-2)
Elementary Botany	Elementary Zoölogy
Bot. 51 3(2-2)	Zoöl. 51 3(1-4)
Industrial Arithmetic A	Applied Mathematics A
Math. 51 4(4-0)	Math. 55 4(4-0)
English I	English II
Engl. 51 4(4-0)	Engl. 54 4(4-0)
Physical Training M-I	Physical Training M-II
Phys. Ed. 51 A..... 1(0-3)	Phys. Ed. 52..... 1(0-3)
Music *	Music *
Music	Music

SECOND YEAR

FIRST SEMESTER	SECOND SEMESTER
Farm Crops	Dairying
Agron. 51 5(4-2)	Dairy Husb. 51..... 2(1-2)
Physiology and Hygiene A	Farm Insects
Vet. 51 3(3-0)	Ent. 61 2(2-0)
Elementary Farm Machinery	Soils and Fertilizers
Farm Engr. 51..... 2(1-2)	Agron. 56 3(2-2)
Breeds and Breeding	Livestock Production
An. Husb. 53..... 2(2-0)	An. Husb. 55..... 3(3-0)
Elementary Chemistry	Elementary Agricultural Chemistry
Chem. 51 4(3-2)	Chem. 53 4(3-2)
English III	English IV
Engl. 61 4(4-0)	Engl. 64 4(4-0)
Military Training I ‡	Military Training II ‡
Mil. Tr. 51..... 1(0-3) or	Mil. Tr. 52..... 1(0-3) or
Physical Training M-I	Physical Training M-II
Phys. Ed. 51 A..... 1(0-3)	Phys. Ed. 52..... 1(0-3)
Music *	Music *
Music	Music

* Elective.

‡ All male students are required to take Physical Training during the first year of their attendance and Military Science during the remaining years.

THIRD YEAR ††

FIRST SEMESTER	SECOND SEMESTER
Elementary Farm Management	Agricultural Bacteriology
Ag. Ec. 51..... 3(2-2)	Bact. 51 3(2-2)
Diseases of Farm Animals	Elementary Agricultural Economics
Vet. 61 2(2-0)	Ag. Ec. 56..... 3(3-0)
Elementary Grain Marketing	American Nation II †
Mill. Ind. 51..... 2(2-0)	Hist. 60 4(4-0) <i>or</i>
American Nation I †	Civics
Hist. 59 4(4-0)	Hist. 63 4(4-0)
Physics A-I	Physics A-II
Physics 51 4(3-2)	Physics 52 4(3-2)
English V	Farm Writing
Engl. 71 3(3-0)	Ind. Jour. 51..... 4(2-4)
Military Training I <i>or</i> III ‡	Military Training II <i>or</i> IV ‡
Mil. Tr. 51 <i>or</i> 53..... 1(0-3) <i>or</i>	Mil. Tr. 52 <i>or</i> 54..... 1(0-3) <i>or</i>
Physical Training M-I	Physical Training M-II
Phys. Ed. 51 A..... 1(0-3)	Phys. Ed. 52..... 1(0-3)
Music *	Music *
Music ———	Music ———

Curriculum in Mechanic Arts

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER	SECOND SEMESTER
English I	English II
Engl. 51 4(4-0)	Engl. 54 4(4-0)
Algebra I	Algebra II
Math. 61 4(4-0)	Math. 62 4(4-0)
Free-hand and Object Drawing	Geometrical Drawing
Arch. 51 3(0-6)	Ap. Mech. 72..... 3(0-6)
Farm Gas Engines I	Elementary Traction Engines I
Farm Engr. 75..... 2(1-2)	Farm Engr. 66..... 2(0-4)
Carpentry I	Molding I
Shop 51 2(0-4)	Shop 96 2(0-4)
Concrete Construction I	Elementary Botany
Ap. Mech. 51, 55..... 2(1-2) <i>or</i>	Bot. 51 3(2-2) <i>or</i>
Elementary Botany	Concrete Construction I
Bot. 51 3(2-2)	Ap. Mech. 51, 55..... 2(1-2)
Blacksmithing I	Blacksmithing II
Shop 69 2(0-4)	Shop 72 2(0-4)
Physical Training M-I	Physical Training M-II
Phys. Ed. 51 A..... 1(0-3)	Phys. Ed. 52..... 1(0-3)
Music *	Music *
Music ———	Music ———

* Elective.

† By special permission students may substitute Ancient History I and II or Modern History I and II for corresponding semesters of American Nation.

†† Third year students may, with the consent of the Principal, elect for substitution: Traction Engines, Gas Engines, Blacksmithing, Concrete Construction, or Nursery Practice.

‡ All male students are required to take Physical Training during the first year of their attendance and Military Science during the remaining years.

SECOND YEAR	
FIRST SEMESTER	SECOND SEMESTER
English III Engl. 61 4(4-0)	English IV Engl. 64 4(4-0)
Plane Geometry I Math. 66 4(4-0)	Plane Geometry II Math. 67 4(4-0)
Physics A-I Physics 51 4(3-2)	Physics A-II Physics 52 4(3-2)
Shop Drawing I Ap. Mech. 75, 80..... 3(1-4)	Shop Drawing II Ap. Mech. 85, 90..... 3(1-4)
Machine Shop I Shop 87 3(0-6)	Strength of Materials Ap. Mech. 70..... 3(3-0)
Military Training I † Mil. Tr. 51..... 1(0-3) or	Military Training II † Mil. Tr. 52..... 1(0-3) or
Physical Training M-I Phys. Ed. 51 A..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
<i>Elective, 3 credits from following:</i>	<i>Elective, 3 credits from following:</i>
Concrete Construction II Ap. Mech. 60..... 3(0-6)	Concrete Construction III Ap. Mech. 65..... 3(0-6)
Carpentry II Shop 54 3(0-6)	Carpentry III Shop 57 3(0-6)
Blacksmithing III Shop 75 3(0-6)	Farm Gas Engines II Farm Engr. 77..... 3(0-6)
	Blacksmithing IV Shop 78 3(0-6)
THIRD YEAR	
FIRST SEMESTER	SECOND SEMESTER
Modern History I † Hist. 55 4(4-0)	Modern History II † Hist. 56 4(4-0)
Solid Geometry Math. 71 4(4-0)	Algebra III Math. 72 4(4-0)
Civics Hist. 63 4(4-0)	Economics Econ. 51 3(3-0)
English V Engl. 71 3(3-0)	
Military Training I or III † Mil. Tr. 51 or 53..... 1(0-3) or	Military Training II or IV † Mil. Tr. 52 or 54..... 1(0-3) or
Physical Training M-I Phys. Ed. 51 A..... 1(0-3)	Physical Training M-II Phys. Ed. 52..... 1(0-3)
<i>Elective, 5 credits from the following:</i>	<i>Elective, 5 credits from the following:</i>
Blacksmithing V Shop 81 3(0-6)	Blacksmithing VI Shop 84 3(0-6)
Machine Shop II Shop 90 2(0-4)	Machine Shop III Shop 93 3(0-6)
Carpentry IV Shop 60 2(0-4)	Carpentry V Shop 63 2(0-4)
Farm Gas Engines III Farm Engr. 80..... 3(0-6)	Farm Gas Engines IV Farm Engr. 82..... 3(0-6)
Elementary Traction Engines II Farm Engr. 69..... 2(0-4)	Elementary Traction Engines III Farm Engr. 72..... 2(0-4)
	Shop Drawing III Ap. Mech. 95..... 2(0-4)

† Ancient History I and II or American Nation I and II may be substituted for Modern History I and II.

‡ All male students are required to take Physical Training during the first year of their attendance and Military Science during the remaining years.

Curriculum in Home Economics

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FIRST SEMESTER		SECOND SEMESTER	
English I		English II	
Engl. 51	4(4-0)	Engl. 54	4(4-0)
Sewing I		Sewing II	
Dom. Art 51.....	2(0-4)	Dom. Art 52.....	2(0-4)
Cooking I		Cooking II	
Dom. Sc. 51.....	3(1-4)	Dom. Sc. 52.....	3(1-4)
General Housekeeping		General Housekeeping II	
Dom. Sc. 61.....	3(3-0)	Dom. Sc. 62.....	3(3-0)
Industrial Arithmetic W		Elementary Design	
Math. 52	4(4-0)	Ap. Art 51.....	3(0-6)
Household Insects		Gardening	
Ent. 51	2(2-0)	Hort. 56	2(1-2)
		Dairying	
		Dairy Husb. 61.....	2(1-2) <i>or</i>
		Carpentry H	
		Shop 66	2(0-4)
Physical Training W-I		Physical Training W-II	
Phys. Ed. 75 A.....	1(0-3)	Phys. Ed. 76.....	1(0-3)
Music *		Music *	
Music	—	Music	—

SECOND YEAR

FIRST SEMESTER		SECOND SEMESTER	
English III		English IV	
Engl. 61	4(4-0)	Engl. 64	4(4-0)
Elementary Chemistry		Elementary Household Chemistry	
Chem. 51	4(3-2)	Chem. 52	4(3-2)
Sewing III		Sewing IV	
Dom. Art 53.....	2(0-4)	Dom. Art 54.....	2(0-4)
Cooking III		Cooking IV	
Dom. Sc. 53.....	2(0-4)	Dom. Sc. 54.....	2(0-4)
Economics		Applied Mathematics W	
Econ. 51	3(3-0) <i>or</i>	Math. 56	4(4-0)
Civics		Elementary Home Decoration	
Hist. 63	4(4-0)	Ap. Art 55.....	3(0-6)
Dress Design and Art Needlework			
Dom. Art 61.....	2(0-4)		
Physical Training W-I <i>or</i> W-III †		Physical Training W-II <i>or</i> W-IV †	
Phys. Ed. 75 A <i>or</i> 77... 1(0-3)		Phys. Ed. 76 <i>or</i> 78.... 1(0-3)	
Music *		Music *	
Music	—	Music	—

* Elective.

† Young women take physical training the first two years of their attendance.

THIRD YEAR

FIRST SEMESTER		SECOND SEMESTER	
English V		English VI	
Engl. 71	3(3-0)	Engl. 74	4(4-0)
Physics H-I		Physics H-II	
Physics 61	4(3-2)	Physics 62	4(3-2)
Ancient History I ‡		Ancient History II ‡	
Hist. 51	4(4-0)	Hist. 52	4(4-0)
Sewing V		El. Textiles and Millinery	
Dom. Art 55	2(0-4)	Dom. Art 62	2(0-4)
Household Bacteriology		Physiology and Hygiene H	
Bact. 61	3(2-2)	Vet. 52	4(4-0)
Elements of Poultry Keeping		Physical Training W-II or W-IV †	
Poult. Husb. 52	2(2-0)	Phys. Ed. 76 or 78	1(0-3)
Physical Training W-I or W-III †		Music *	
Phys. Ed. 75 A or 77	1(0-3)	Music	—
Music *			
Music	—		

Agricultural Courses

AGRICULTURAL ECONOMICS

51. ELEMENTARY FARM MANAGEMENT. Third year, first semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Farm Crops; Soils and Fertilizers; and Livestock Production. Assistant Professor Zahnley.

56. ELEMENTARY AGRICULTURAL ECONOMICS. Third year, second semester. Class work, three hours. Three semester credits. Prerequisites: Agron. 51 and 56; An. Husb. 55.

The course presents the more important principles pertaining to the business side of farming. Farm organization, the characteristics of the factors of production and the intensity culture are followed by a study of farm tenancy, the forces determining the value of agricultural products, and the problems of marketing. Finally profits of farmers in relation to their efficiency and their ability to purchase land are discussed. The course is conducted by lectures, texts and supplementary reading. Texts: Taylor's *Agricultural Economics*; and Ely and Wicker's *Elementary Principles of Economics*.

AGRONOMY

51. FARM CROPS. Second year, first semester. Class work, four hours; laboratory, two hours. Five semester credits. Prerequisite: Botany. Assistant Professor Zahnley.

The course involves a study of both grain and forage crops, approximately one-half semester being given to each. Emphasis is placed upon the economic production of those crops which are of greatest importance in Kansas. The laboratory work is planned to acquaint the student with the different grain and forage plants and their habits of growing. Text: Wilson and Warburton's *Field Crops*.

56. SOILS AND FERTILIZERS. Second year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Prerequisites: Elementary Chemistry; Farm Crops. Assistant Professor Zahnley.

* Elective.

† Young women take physical training the first two years of their attendance.

‡ American Nation I and II or Modern History I and II may be substituted for the corresponding terms of Ancient History.

The course involves a study of the physical nature of soils and their adaptation to crops, together with proper methods of handling to maintain good physical condition, to conserve moisture and to prevent washing and blowing. Means of maintaining the fertility of the soil, the care and use of barnyard manure; green manure and commercial fertilizers are also considered. In the laboratory and on field trips different soils are studied with reference to their physical properties and their relation to crops and methods of management. Text: Whitson and Walster's *Soils and Fertilizers*.

ANIMAL HUSBANDRY

51. STOCK JUDGING. First year, first semester. Laboratory, six hours. Three semester credits.

This course consists in score-card practice in judging horses, beef cattle, dairy cattle, sheep and swine, in which the students become familiar with the general points to be observed in judging livestock. One-fourth of this time is given to the study of dairy cattle presented by the Department of Dairy Husbandry. Text: Craig's *Judging Livestock*.

53. BREEDS AND BREEDING. Second year, first semester. Class work, two hours. Two semester credits. Prerequisite: Stock Judging. Mr.

This course consists of the study of pure-bred horses, cattle, sheep and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text: Mumford's *Breeding of Farm Animals*.

55. LIVESTOCK PRODUCTION. Second year, second semester. Class work, three hours. Three semester credits. Prerequisites: Elementary Chemistry, and Breeds and Breeding.

This course involves the study of the comparison and usefulness of various feeds, and a study of successful and economical methods of growing and finishing cattle, sheep and hogs for market purposes, as well as the breeding of both market and pure-bred animals. Text: Henry and Morrison's *Feeds and Feeding*, abridged edition.

DAIRY HUSBANDRY

61. DAIRYING. First year, second semester, in home economics; and second year, second semester, in agriculture. Lecture, one hour; laboratory, two hours. Two semester credits. Mr. Atkeson.

This course includes lectures on the various breeds of dairy cattle, milk and its composition, Babcock testing, separation and churning. Two individual lectures are given to the agricultural students on feeding the dairy herd and two additional lectures on cheese making to the home economics students.

Laboratory.—The laboratory work comprises the operation of the Babcock test, separating milk, churning, and soft-cheese making.

STOCK JUDGING. (An. Husb. 51.) Assistant Professor Cave.

Four weeks are given over to the judging of dairy cattle. The rest of the course is devoted to the study of the breeding and market types of horses, cattle, sheep and swine, and is presented by the Department of Animal Husbandry.

HORTICULTURE

51. FRUIT GROWING. First year, second semester. Class work, two hours; laboratory, two hours. Three semester credits. Mr. Pickett.

This course includes a study of the principles of vegetable gardening and fruit growing. The first half of the semester is given to the prob-

lems of general fruit growing, and the vegetable gardening comprises practices in garden making and lectures during the last half of the semester.

56. GARDENING. First year, second semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. Pratt.

The practices and principles involved in the cultivation and care of home and market gardens are here studied.

MILLING INDUSTRY

51. ELEMENTARY GRAIN MARKETING. Third year, first semester. Class work, two hours. Two semester credits. Professor Fitz.

In this course are studied methods of harvesting, handling and storing grain, together with the marketing of surplus grain from the farm. This involves methods of selling or buying, shipping and grading grain; organization of grain-inspection departments, with their merits and defects; the principal grain markets, with receipts and shipments of grain consumed. The by-products resulting from manufacture of food products from grain will be studied with regard to their feeding value and comparative cost.

POULTRY HUSBANDRY

51. BEGINNING POULTRY. First year, first semester. Recitation, one hour; laboratory, two hours. Two semester credits. Mr. Fox.

This course takes up a discussion of the various operations that go to make up the art of poultry keeping.

Laboratory.—The laboratory study includes work in dressing, packing and caponizing.

52. ELEMENTS OF POULTRY KEEPING. Third year, first semester. Recitation, two hours. Two semester credits. Professor Lippincott and Mr. Fox.

This course covers the same ground as Beginning Poultry, except that no laboratory work is required.

VETERINARY MEDICINE AND PHYSIOLOGY

51. PHYSIOLOGY AND HYGIENE A. Second year, first semester. Class work, three hours. Three semester credits. Doctor Vawter.

This course includes the study of the anatomical structure and physiological functions of the human body. It includes a careful consideration of such factors in the maintenance of health as fresh air, diet, sleep, bathing and exercise. Text: Conn and Buddington's *Advanced Physiology and Hygiene*.

52. PHYSIOLOGY AND HYGIENE H. Third year, second semester. Class work, four hours. Four semester credits. Doctor Vawter.

Sufficient consideration is given to the anatomy or structure of the body to enable the student to understand more fully the functions of the proper parts. The normal functions of the various organs of the body are studied. The importance of the normal functioning of the body for the prevention of diseases, and also diseases that may arise from improper performance of the various organs are discussed.

61. DISEASES OF FARM ANIMALS. Third year, first semester. Class work, two hours. Two semester credits. Doctor Gingery.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application of first aid in disease or accident of farm animals. The various diseases resulting from the use of spoiled foods or the improper or injudicious

use of good foods are discussed. The value of food, care and the nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means of their prevention and eradication are considered. Text: Craig's *Common Diseases of Farm Animals*.

General Science Courses

BACTERIOLOGY

51. AGRICULTURAL BACTERIOLOGY. Third year, second semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Professor Bushnell.

An elementary course in the principles of bacteriology is here offered. Bacteriological problems are considered from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc.

Laboratory.—General laboratory manipulations. Normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of fermentations, of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

61. HOUSEHOLD BACTERIOLOGY. Third year, first semester. Lectures, two hours; laboratory, two hours. Three semester credits. Prerequisite: Chemistry, one year. Professor Bushnell.

This course includes a general survey of the science of bacteriology as applied to the home. It includes a discussion of microorganisms as related to air, water, foods, general sanitation, fermentations, etc. An attempt is made to present the subject in as simple a manner as possible. The course is offered in the hope of giving the student a general understanding of the fundamentals, and a reading knowledge of the science.

Laboratory.—Various microscopic forms of importance in fermentation; preservation and spoilage of foods; the influence of various preservatives upon microorganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material, etc., are the subjects taken up in the laboratory work.

BOTANY

51. ELEMENTARY BOTANY. First year, both semesters. Class work, two hours; laboratory, two hours. Three semester credits.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity; and the structure and work of the root, stem and leaf system is studied in some detail. The biology of the flower and its peculiar adaptations to insect or wind pollination is emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course emphasis is laid on the relations of plants to light, air, water and soil, and on the relation of the biology of the plants to agricultural practice.

CHEMISTRY

51. ELEMENTARY CHEMISTRY. Second year, first semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Mr. Keith.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine, and

carbon, and their most important compounds, as its basis. Sulphur and phosphorus, and to a slight extent other nonmetals, are studied, and following this a study of the metals and their most important compounds is begun. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds. Textbook: McPherson and Henderson's *First Course in Chemistry*.

52. ELEMENTARY HOUSEHOLD CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Keith.

In the work of this term the study of the metals is completed, and chemistry is then studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

53. ELEMENTARY AGRICULTURAL CHEMISTRY. Second year, second semester. Lectures and recitations, three hours; laboratory, two hours. Four semester credits. Prerequisite: Elementary Chemistry. Mr. Keith.

The study of the metals, begun the previous semester, is first completed. The chemical composition and chemistry of the growth of plants and animals is then taken up, and the general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work follows these lines and is made as practical as possible. Textbook: Snyder's *Chemistry of Plant and Animal Life*.

ECONOMICS

51. ECONOMICS. Second or third year, both semesters. Class work, three hours. Three semester credits. Associate Professor Merritt.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

ENGLISH

51. ENGLISH I. First year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice, Miss Leonard, and Mr. Hazlett.

This course has a twofold purpose: to develop in the student the ability to interpret readily from the printed page, and to give instruction in the elementary principles of composition. For the first aim, short selections from the readers are used, with readings from textbooks, biographies, current periodicals, and works of a vocational nature. In connection with the text, practice work in letter writing and business forms is emphasized. Texts: Searson and Martin, *Studies*, Advanced Course; Hansen, *Two Years' Course in English Composition*.

54. ENGLISH II. First year, second semester. Class work, four hours. Four semester credits. Miss Leonard and Mr. Hazlett.

This course is a continuation of English I. It includes a review of grammar, practice in the use of the dictionary, and a thorough study of the paragraph. Oral composition is required. Emphasis is placed on the writing of themes on topics of keenest interest to the student. Text: Hanson, *Two Years' Course in English Composition*, chapters IX-XIII, inclusive.

61. ENGLISH III. Second year, first semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Miss Russel.

The work of this course consists of a study of American literature. Class readings, class discussions, written sketches, abstracts and outlines are required. The aim of the course is to familiarize the student with the masterpieces of his own countrymen, and to offer continued study in the cultural as well as the practical side of literature and language. Text: Cairns, *American Literature for Secondary Schools*, to page 147.

64. ENGLISH IV. Second year, second semester. Class work, four hours. Four credits. Miss Leonard and Miss Russel.

This course is a continuation of the work in English III, completing the work of the text. Selections from the works of Poe, Webster, Lincoln, Longfellow, Whittier, Emerson, Lowell, Holmes and others are chosen for study, and some written work is required. Text: Cairns, *American Literature for Secondary Schools*, page 147 to end.

71. ENGLISH V. Third year, first semester. Class work, three hours. Three semester credits. Miss Leonard and Miss Russel.

This is a course in advanced composition. It includes instruction in the four forms of discourse, practice in the preparation of original themes, oral English, elementary debating, and a continuation of first-year work in commercial usage. Texts: Hansen, *Two Years' Course in English Composition*, Part III; Davis and Lingham, *Business English and Correspondence*.

74. ENGLISH VI. Third year, second semester. Class work, four hours. Four semester credits. Assistant Professor Rice and Mr. Hazlett.

This is a course in English classics. It includes an intensive study of representative classics. Abstracts, outlines, paraphrases, and original themes are required. Texts: Selections from the works of Shakspeare, Scott, Burns, Tennyson, and others.

ENTOMOLOGY

51. HOUSEHOLD INSECTS. First year, first semester. Class work, two hours. Two semester credits. Professor Dean.

This course consists of illustrated lectures and reference reading on the habits, life history, and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

61. FARM INSECTS. Second year, second semester. Class work, two hours. Two semester credits. Prerequisite: General Biology. Associate Entomologist McCulloch.

This is a study of the elementary anatomy, structure, and physiology of insects, complete enough to give a clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

HISTORY

51, 52. ANCIENT HISTORY I AND II. Third year, first and second semesters. Class work, four hours. Four semester credits for each course. Miss Orem.

The history of civilization in the Nile and the Tigris-Euphrates valleys serves as an introduction to the more serious work of this course in which the emphasis is placed upon the history of Greece and Rome and western Europe down to 800 A.D. In addition to the greater political

events characterizing the history of these regions, special attention is given to the institutional life of this period, to the social, economic and intellectual forces at work in the different states as well as to their governmental organization. Text: Westermann's *The Story of the Ancient Nations*.

55, 56. MODERN HISTORY I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Miss Orem.

Beginning with 800 A.D., a general survey is made of the development of Europe down to the present time and conditions. The more important events of the eleven centuries comprising this period are treated in as full detail as time will permit. The social, economic, cultural, religious, and diplomatic phases are emphasized. In view of the fact that greater changes have taken place in Europe since 1789 than in the thousand years preceding, special attention is given to the social and economic developments of this period and to the political developments and international relations, especially the changes which have prepared the way for the present European situation. Text: Harding's *New Medieval and Modern History*.

59, 60. AMERICAN NATION I AND II. Third year, first and second semesters, respectively. Class work, four hours. Four semester credits for each course. Assistant Professor James and Miss Orem.

This course consists of a survey of American history from the discovery of America to the present time. It deals with the establishment of the English colonies in America; the growth of social and political institutions in these colonies; the development of an American nationality; the struggle among European nations for the possession of North America; the causes and meaning of the American Revolution; the formation and establishment of the constitution; the rise of the West and its influence, socially, politically and economically; the growth of sectionalism, the secession movement and the struggle to preserve the Union; and the important events characterizing American history since the termination of the contest between the North and the South. Along with the political history of the United States, a study of its economic development is made for the purpose of understanding the steps by which America, from humble beginnings in the colonial period, has reached its present high position as an industrial state. Texts: West's *History of the American People*, and Bogart's *The Economic History of the United States*.

63. CIVICS. Second and third years, both semesters. Class work, four hours. Four semester credits. Assistant Professor James and Miss Orem.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text: Guiteau's *Government and Politics in the United States*, Kansas edition.

65. ELEMENTARY INDUSTRIAL HISTORY. Elective. Class work, four hours. Four semester credits. Assistant Professor James.

This course is devoted to a study of American industrial life: how industries have developed, how they have modified our history and government, and how in turn they have been modified by historical development and governmental regulations. The course is based primarily on the third edition of Bogart's *Economic History of the United States*.

INDUSTRIAL JOURNALISM AND PRINTING

51. FARM WRITING. Third year, second semester. Class work, two hours; laboratory, four hours. Four semester credits. Miss Polson.

The course treats of the elementary principles of writing for newspapers and farm publications, on such subjects as the students are

likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

MATHEMATICS

51. INDUSTRIAL ARITHMETIC A. First year, first semester. Class work, four hours. Four semester credits. Mr. Fehn.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; and (2) the application of these principles to practical problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science are made the basis of the problem work. Farm investments, farm accounts and farm values receive special attention. Text: Stratton and Remick's *Agricultural Arithmetic*.

52. INDUSTRIAL ARITHMETIC W. First year, first semester. Class work, four hours. Four semester credits. Miss Holroyd and Miss McKittrick.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied so as to meet the needs of young women. Text: Same as for the course above.

55. APPLIED MATHEMATICS A. First year, second semester. Class work, four hours. Four semester credits. Mr. Fehn and Miss Holroyd.

The course includes an introduction to the first principles of algebra and geometry; the use and meaning of symbols; simple problems in algebraic reckoning; the solution of simple equations of the first and second degrees; graphical solutions; geometrical constructions; illustration rather than proof of important geometrical theorems; computation of areas and volumes, with emphasis upon the problems arising from building and construction on the farm. Text: Breslich's *First Year Mathematics*.

56. APPLIED MATHEMATICS W. Second year, second semester. Class work, four hours. Four semester credits. Miss McKittrick.

This course presents work similar to that of Applied Mathematics A, with adaptations to the needs of young women. Text: Same as for course preceding.

61. ALGEBRA I. First year, first semester. Class work, four hours. Four semester credits. Mr. Fehn.

This course includes a study of the four fundamental operations, integral linear equations, factoring, and fractions. Text: Wells and Hart's *New High School Algebra*.

62. ALGEBRA II. First year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra I. Assistant Professor Stratton.

The subjects considered are ratio and proportion, graphical representation, simultaneous linear equations, involution, evolution, theory of exponents, radicals, quadratic equations, and application to practical problems. Text: Wells and Hart's *New High School Algebra*.

66. PLANE GEOMETRY I. Second year, first semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Miss Holroyd.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

67. PLANE GEOMETRY II. Second year, second semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry I. Mr. Fehn.

Books III, IV and V of Wentworth and Smith's *Plane and Solid Geometry* are included in this course.

71. SOLID GEOMETRY. Third year, first semester. Class work, four hours. Four semester credits. Prerequisite: Plane Geometry II. Mr. Fehn and Miss Holroyd.

Books VI, VII and VIII of Wentworth and Smith's *Plane and Solid Geometry* form the subject matter of this course.

72. ALGEBRA III. Third year, second semester. Class work, four hours. Four semester credits. Prerequisite: Algebra II. Mr. Fehn and Miss Holroyd.

This course includes, besides a rapid review of factoring, fractions, linear equations, roots, radicals, and exponents, a treatment of quadratic forms with graphical work and theory, ratio and proportion, variation, the progressions, and the binomial theorem for positive integral exponents. Text: Hawkes, Luby and Touton's *Second Course in Algebra*.

MILITARY TRAINING

All young men are required to take Military Training during their second and third years in the School of Agriculture. They are organized as the Junior Division of the Reserve Officers Training Corps. The general features of the work of the Corps are given in this catalogue under the Department of Military Training, Division of General Science.

JUNIOR DIVISION, R. O. T. C.

51. MILITARY TRAINING I. First semester. Three hours. One semester credit. (a) *Practical*: Physical training; infantry drill, School of the Soldier, squad and company in close and extended order; preliminary instruction in sighting, position and aiming drill. (b) *Theoretical*: Theory of target practice; military organization; map reading; personal hygiene.

52. MILITARY TRAINING II. Second semester. Three hours. One semester credit. (a) *Practical*: Physical training; infantry drill to School of the Battalion; ceremonies; Manual of Interior Guard Duty; bayonet combat; first aid instruction. (b) *Theoretical*: Manual of Interior Guard Duty; map reading; camp sanitation for small commands; Infantry Drill Regulations to include School of Company.

53. MILITARY TRAINING III. First semester. Three hours. One semester credit. (a) *Practical*: Same as course 51 (a); fire direction and control; gallery practice. (b) *Theoretical*: Lectures, military policy of the United States and the military obligations of citizenship; Field Service regulations.

54. MILITARY TRAINING IV. Second semester. Three hours. One semester credit. (a) *Practical*: Same as course 52 (a); first-aid instruction; range and gallery practice; combat firing or collective firing in indoor ranges; entrenchments. (b) *Theoretical*: Infantry Drill Regulations to include School of Battalion; Small Arms Firing Regulations; marches and camping; signaling; military hygiene.

MUSIC

Music is offered as an elective for both young women and young men. Instruction is furnished free to all regular students assigned to music classes, but for individual instruction a fee is charged. Further particulars are given in the article on "Music," elsewhere in this catalogue.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

51A. PHYSICAL TRAINING M-I. First semester. Three hours. One semester credit. Required of all young men during their first semester in the school.

The course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each semester. Swimming is taught in the spring. A physical examination is made of each student when he enters. During the fall rugby football and soccer football are given. From the first of December to the end of the semester the work is in the gymnasium. Elementary calisthenics and Swedish movements, elementary apparatus, and games are taught.

Hygiene and social problems are discussed. This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in the school, as well as for gaining the highest development of vital power and health for future duties.

52. PHYSICAL TRAINING M-II. Second semester. Three hours. One credit. Required of all young men during their second semester in the school.

This course is a continuation of Physical Training M-I. In the spring, as soon as weather conditions allow, the work consists of baseball and track and field athletics.

WOMEN'S DEPARTMENT

75A, 76. PHYSICAL TRAINING W-I AND W-II. First and second semesters, respectively. Three hours. One semester credit for each course. Miss Bond and Dean Van Zile.

This is an introductory course. It includes corrective exercises, light apparatus work, folk dancing, games, and swimming. A physical examination is made of each young woman before she enters upon the work.

Instruction in hygiene and social problems is an essential part of course 75A. In these lectures, which are given by Mary P. Van Zile, Dean of Women, in addition to the problems of hygiene as applied to individual health, the biological truths that lead to serious, respectful consideration of social and sex hygiene are presented.

77, 78. PHYSICAL TRAINING W-III AND W-IV. First and second semesters. Three hours. One semester credit for each course. Miss Bond.

These courses are a continuation of Physical Training W-I and W-II. Esthetic dancing, Swedish gymnastics, games and swimming are taught in these courses.

PHYSICS

51. PHYSICS A-I. Second or third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Algebra II. Assistant Professors Stewart and Smith.

The fundamental laws of mechanics, heat and sound are presented in this course. The application of principles to the common things of everyday life is emphasized. The laboratory work is based upon the work done in class, and is outlined in such a manner as to give the students special drill in exact measurements. Text: Black and Davis's *Practical Physics*.

52. PHYSICS A-II. Second or third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics A-I. Assistant Professors Stewart and Smith.

This course is a continuation of Physics A-I. The subjects of magnetism, electricity, and light are considered. An introductory study is made of the units used in measuring electrical energy, the principles involved in current distribution, the uses now being made of electricity, the ordinary phenomena of light, and of questions of modern illumination. Text: Black and Davis's *Practical Physics*.

61. PHYSICS H-I. Third year, first semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Algebra III. Professor Hamilton.

The work given in this course has a direct bearing on the principles of mechanics, sound and heat as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text: Tower, Smith and Turton's *Physics*.

62. PHYSICS H-II. Third year, second semester. Class work, three hours; laboratory, two hours. Four semester credits. Prerequisite: Physics H-I. Professor Hamilton.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity and light are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text: Tower, Smith and Turton's *Physics*.

ZOOLOGY

51. ELEMENTARY ZOOLOGY. First year, second semester. Class work, one hour; laboratory, four hours. Three semester credits.

This course deals with the natural history of animals. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology. The laboratory work consists of one three-hour period a week. This work is carried on for the most part out of doors. The ponds and streams, meadows and woodlands are visited and the animals studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria, and such study is given them as is not permitted out in the field.

Mechanic Arts Courses

ARCHITECTURE AND DRAWING

51. FREE-HAND AND OBJECT DRAWING. First year, first semester. Laboratory, six hours. Three semester credits. Mr. Smutz.

The work of this course includes exercises in drawing simple figures illustrating the effects of geometrical arrangement and the laws of design; the principles of perspective are studied and illustrated by drawing from geometric solids and simple objects. Practice is given in free-hand lettering and in sketching objects of the shops and out-of-doors.

APPLIED MECHANICS

51. CONCRETE CONSTRUCTION I RECITATION. First year, both semesters. Lectures and recitations, one hour. One semester credit. Assistant Professor Wendt and Mr. ———.

Instruction is given in the principles governing the selection and preparation of materials, the proper proportioning of materials for different conditions, the construction of forms, mixing and handling concrete,

elementary reinforced concrete construction, finishing concrete surfaces, stucco and plaster work, and waterproofing and coloring concrete. A brief study is made of the application of these principles to the making of concrete foundations, building blocks and bricks, posts, sidewalks, floors, tanks, cisterns, silos, and bridges and culverts. Text: Seaton's *Concrete Construction for Rural Communities*.

55. CONCRETE CONSTRUCTION I, LABORATORY. First year, both semesters. Laboratory work, two hours. One semester credit. Must accompany or follow Concrete Construction I Recitation (Ap. Mech. 51). Assistant Professor Wendt and assistants.

Laboratory and field work is given in hand and machine mixing and handling of concrete, and in the construction of forms, for such objects as machine and building foundations, floors, sidewalks, fence posts and building blocks. Tests are made on concrete cylinders and beams to illustrate the effect of different methods of treatment on the strength and reliability of plain and reinforced concrete.

60. CONCRETE CONSTRUCTION II. Second year, first semester. Laboratory, six hours. Three semester credits. Prerequisites: Concrete Construction I, Laboratory (Ap. Mech. 55). Assistant Professor Wendt.

Field work is given in practical plain and reinforced concrete construction, with lectures on field methods of bending steel, of placing it and securing it in place, and of mixing and placing concrete, with special reference to building and bridge construction. Simple laboratory tests of steel, of concrete and of reinforced concrete beams are also included.

65. CONCRETE CONSTRUCTION III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Concrete Construction II (Ap. Mech. 60). Mr. ———.

This course includes standard tests for fineness, specific gravity, soundness and strength of cement, for voids, uniformity coefficient and cleanness of sand and stone, and for the effect of variation of these factors on the strength of mortars and concretes.

70. STRENGTH OF MATERIALS. Second year, second semester. Class work, three hours. Three semester credits. Prerequisite: Concrete Construction I Recitation (Ap. Mech. 51). Mr. ———.

The course embraces a study of the strength of beams, columns and other structural and machine elements, of wood, steel, concrete and other materials.

72. GEOMETRICAL DRAWING. First year, second semester. Laboratory, six hours. Three semester credits. Mr. ———.

This course comprises free-hand lettering, the use of drawing board, T-square and instruments, the construction of perpendiculars, parallels, angles, polygons and curves, and orthographic projections of simple objects. Accuracy is emphasized.

75. SHOP DRAWING I, LECTURE. Second year, first semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Geometrical Drawing. Geometry I (Math. 66) must accompany or precede this course. Assistant Professor Pearce and Mr. Robert.

A study is made of the selection, use and care of drawing instruments, lettering, orthographic, cabinet and isometric projections, and the development of surfaces. Text: French's *Engineering Drawing*.

80. SHOP DRAWING I, LABORATORY. Second year, first semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 75). Assistant Professor Pearce and Mr. Robert.

Practice is given in lettering, in the construction of orthographic, cabinet, and isometric projections of objects and in the development of surfaces. Text: French's *Engineering Drawing*.

85. SHOP DRAWING II, LECTURE. Second year, second semester. Lectures and recitations, one hour. One semester credit. Prerequisite: Shop Drawing I (Ap. Mech. 80). Assistant Professor Pearce and Mr. _____.

A continuation of the preceding course, with the study of conventional methods of representation, working drawings, technical sketching, and methods of reproducing working drawings. Text: French's *Engineering Drawing*.

90. SHOP DRAWING II, LABORATORY. Second year, second semester. Drafting-room practice, four hours. Two semester credits. Must accompany the lecture (Ap. Mech. 85). Assistant Professor Pearce and Mr. _____.

Working drawings are made from plates during the first part of the semester. Later, free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making tracings and blue prints.

95. SHOP DRAWING III. Third year, second semester. Drafting-room practice, four hours. Two semester credits. Prerequisites: Shop Drawing II (Ap. Mech. 90). Assistant Professor Pearce and Mr. _____.

Practice is given in making working drawings from free-hand sketches of machine parts, assembly drawings, and in designing simple machine parts by empirical methods.

FARM ENGINEERING

51. ELEMENTARY FARM MACHINERY. Second year, first semester. Class work, one hour; laboratory, two hours. Two semester credits. Mr. _____.

In this course the student is taught the principles underlying the construction, operation and adjustment of the different types of farm machinery. Instruction is also given in fencing, rope work and belt splicing. Proper adjustment and operation of machines is taught in the laboratory and in the field.

66. ELEMENTARY TRACTION ENGINES I. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Assistant Professor Sanders and assistants.

A study is made of gas traction engines, including motors, frames, transmission systems, cooling systems, ignition systems, lubricating systems, and carburetors; operation, care, repair and testing of gas traction engines.

69. ELEMENTARY TRACTION ENGINES II. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Traction Engines I (Farm Engr. 66). Assistant Professor Sanders and assistants.

Practice is given in the operation, care, and testing of various types of gasoline and kerosene traction engines, including belt tests, road tests and field tests.

72. ELEMENTARY TRACTION ENGINES III. Third year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Traction Engines II (Farm Engr. 69). Assistant Professor Sanders and assistants.

This is a continuation of Elementary Traction Engines II, and includes special tests on gas traction engines.

75. FARM GAS ENGINES I. First year, both semesters. Class work, one hour; laboratory, two hours. Two semester credits. Assistant Professor _____ and assistants.

A study is made of gasoline and kerosene engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems, lubrication, governing; selection, erection and operation of stationary gasoline and kerosene engines; fundamental parts of automobiles.

77. FARM GAS ENGINES II. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines I (Farm Engr. 75). Assistant Professor — and assistants.

A detailed study is made of gas-engine operation and care, with special attention to ignition systems, carburetors and testing. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters and carburetors; tests of ignition equipment and carburetors are also studied.

80. FARM GAS ENGINES III. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines II (Farm Engr. 77). Assistant Professor — and assistants.

This course consists of the operation, repair and testing of gas and oil engines.

82. FARM GAS ENGINES IV. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Farm Gas Engines III (Farm Engr. 80). Assistant Professor — and assistants.

This is a continuation of Gas Engines III, including special tests.

SHOP WORK

51. CARPENTRY I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Parker and Mr. —.

This is a course of exercises in constructive carpentry, which are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork.

54. CARPENTRY II. Second year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: none. Mr. Parker and Mr. —.

This course includes exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the face-plate and with hollow chucks. Some of the exercises are: tool handles, dumb-bells, rolling-pins, napkin rings, table legs, porch posts, balusters, built-up and solid newel posts, columns and rosettes.

57. CARPENTRY III. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Carpentry I (Shop 51). Mr. Parker and Mr. —.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture molding, picture frames, and simple pieces of furniture, which are stained, varnished or otherwise finished.

60. CARPENTRY IV. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Carpentry III (Shop 57). Mr. Parker and Mr. —.

This course consists of hand work with the rabbet, router, beading and matching planes, and with the dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jams, and molding.

63. CARPENTRY V. Third year, second semester. Laboratory, supplemented by lectures, four hours. Two semester credits. Prerequisite: Carpentry IV (Shop 60). Mr. Parker and Mr. _____.

The fundamental factors to be taken into consideration in the construction of buildings, as selection of the building site, laying out and squaring the foundation, excavating, types of foundations, form building for concrete, anchoring, placing of the sills, joists, bridging and studding, and bracing, rafter cutting and fitting, are studied in this course. The laboratory work consists of exercises along the lines given above.

66. CARPENTRY H. First year, second semester. Laboratory, four hours. Two semester credits. For women only. Mr. Parker and Mr. _____.

A practical course in woodwork, in which the student makes simple articles, the making of which gives the proper training in the use of tools, and familiarity with the different kinds of woods, stains, varnishes, and paints. Supplementary lectures are given along with the laboratory work in order to bring out the different points more clearly.

69. BLACKSMITHING I. First year, both semesters. Laboratory, four hours. Two semester credits. Mr. Lynch and Mr. Granell.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting and punching, together with instruction in the proper use and care of the fire and tools, and in handling the metals in the forge. Tools required: A two-foot rule, a pair of five-inch outside calipers, a center punch and a ball-pen hammer weighing, with handle, about two pounds.

72. BLACKSMITHING II. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Blacksmithing I (Shop 69). Mr. Lynch and Mr. Granell.

This work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade. Tools required: Same as for Blacksmithing I.

75. BLACKSMITHING III. Second year, first semester. Laboratory, supplemented by lectures, six hours. Three semester credits. Prerequisite: Blacksmithing II (Shop 72). Mr. Lynch and Mr. Granell.

A practical course in the various forging operations, with practice both as a blacksmith and helper, including the planning and laying out of work with special provisions for duplicate parts. Forging and forming tools are made as the nature of the work requires. Lectures are given so that the principles underlying the different operations may be thoroughly understood. Tools required: Same as for Blacksmithing I.

78. BLACKSMITHING IV. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing III (Shop 75). Mr. Lynch and Mr. Granell.

This course includes the theory of hardening, tempering and annealing, case- and pack-hardening; a study of the nature of the different grades of carbon tool steel; tool forging, including the proper manipulation of the various lathe, planer and shaper tools; forging and heat treating special and high-speed steels. Instruction is by lectures and demonstrations. Tools required: Same as for Blacksmithing I.

81. BLACKSMITHING V. Third year, first semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing IV (Shop 78). Mr. Lynch and Mr. Granell.

General shop work is here given, in which emphasis is laid on the quantity as well as the quality of the work, the idea being to give the student a knowledge of the amount of time required to do certain work. The work is varied so that the knowledge acquired will be as complete as possible. Tools required: Same as for Blacksmithing I.

84. BLACKSMITHING VI. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Blacksmithing V (Shop 81). Mr. Lynch and Mr. Granell.

This is a continuation of Blacksmithing V, with practice with the oxyacetylene and thermit processes of welding. Tools required: Same as for Blacksmithing I.

87. MACHINE SHOP I. Second year, first semester. Laboratory, six hours. Three semester credits. Mr. Jones, Mr. Bundy, and Mr. Whippo.

Practical machine work in the building and assembling of gas engines and wood lathes. Exercises are given to bring into use the various machines in the shops. Tools required: A four-inch scale or B. & S. slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, and one B. & S. center gage.

90. MACHINE SHOP II. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Machine Shop I (Shop 87). Mr. Jones, Mr. Bundy, and Mr. Whippo.

This course embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

93. MACHINE SHOP III. Third year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Machine Shop II (Shop 90). Mr. Jones, Mr. Bundy, and Mr. Whippo.

A continuation of the preceding term's work, with work on the milling machines and universal grinder.

96. MOLDING I. First year, second semester. Laboratory, four hours. Two semester credits. Mr. Grant.

This course consists of floor and bench molding with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also, open sand work, sweep molding, machine molding, core making, setting of cores, gates and risers, and different methods of venting.

Home Economics Courses

APPLIED ART

51. ELEMENTARY DESIGN. First year, second semester. Laboratory, six hours. Three semester credits. Miss Averill.

The principles underlying pleasing color combinations, fine proportions, and consistent arrangement of parts are studied. Many exercises are given in selecting from objects of clothing and house furnishings those involving color harmonies, consistent shapes, and orderly arrangement. Original problems are given in the application of these principles.

55. ELEMENTARY HOME DECORATION. Second year, second semester. Laboratory, six hours. Three semester credits. Prerequisite: Elementary Design. Miss Averill.

Design, principles of color, form and arrangement are studied in application to all problems involved in home decoration, such as window, door and wall spacings, woodwork, wall coverings and floor coverings; appropriate furniture, and the arrangement of these in different rooms.

DOMESTIC ART

51. SEWING I. First year, first semester. Laboratory, four hours. Two semester credits. Miss _____.

The purpose of this course is to give a knowledge of textiles and to develop skill in their use as related to clothing. The fundamental stitches are applied in making a laundry bag. Study is made of the economy of mending, with practice on the various weaves and fabrics. The work of the machine is applied to simple garments. Special attention is given to Red Cross work. A notebook is required.

52. SEWING II. First year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Sewing I. Miss _____.

This course includes a study of general factory conditions; purpose and work of the Consumer's League and child-labor laws as they tend to affect and control the manufacture and sale of factory-made garments. Special attention is given to the selection of materials and trimmings suitable for underwear, with a brief history of lace and embroidery. Patterns are drafted and the following garments constructed: kimono, petticoat, fancy corset cover, and chemise. A notebook is required.

53. SEWING III. Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Sewing II. Miss _____.

A special study is given in this course to appropriate dress as expressed in the selection of designs, material and color of the costume for the individual. Patterns are drafted, alterations made, and the following garments completed: tailored wash skirt, tailored waist, fancy lingerie waist, and a simple cotton dress.

54. SEWING IV. Second year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Sewing III and Dress Design. Miss _____.

This course offers a study of commercial patterns, woolen materials, and the conditions governing the price, selection, and wearing qualities of ready-made garments. A simple woolen dress, a tailored wool skirt or a silk blouse is completed.

55. SEWING V. Third year, first semester. Laboratory, four hours. Two semester credits. Prerequisites: Sewing I, II, III, IV, and Dress Design. Miss _____.

This course emphasizes art in relation to dress; includes practice in cutting, fitting, finishing, and draping of such materials as silks, satins, chiffons, and laces.

61. DRESS DESIGN AND ART NEEDLEWORK. Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Elementary Design. Miss Hunt.

The course comprises, during the first nine weeks, the study of design, of color harmony and its application to costumes and embroidery, and the making of costumes in pencil and water color. The last nine weeks of the semester the course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work, and their application to undergarments, waists, collars, and household articles.

62. ELEMENTARY TEXTILES AND MILLINERY. Third year, second semester. Laboratory, four hours. Two semester credits. Miss Fecht and Miss _____.

During the first nine weeks the history and manufacture of textiles, the development of spinning and weaving, and classification and nature of fibers are studied and practical tests are made for adulterations. The course includes, during the last nine weeks of the semester, a study of the practical and artistic principles of millinery; practice in making bows, rosettes, and other forms of hat decoration; the use of velvet, felt and straw; and a brief study of manufacturing conditions.

DOMESTIC SCIENCE

51. COOKING I. First year, first semester. Recitation, one hour; laboratory, four hours. Three semester credits. Miss Perry.

Carbohydrates and protein foods are studied; their source, composition, manufacture and dietetic value are considered. The laboratory work includes practice in cooking fruits, vegetables, cereals, sugar, milk, and eggs. Six simple meals are served to members of the class, that they may receive instruction in acting as hostess, host and waitress.

52. COOKING II. First year, second semester. Recitation, one hour; laboratory, four hours. Three semester credits. Prerequisite: Cooking I. Miss Perry.

The study of protein food is continued as outlined above, followed by work with various leavening agents. The first part of the semester is devoted to the cooking of legumes and meats, with some work in frying and pastry making. The rest of the semester is devoted to practice in the use of various leavening agents, with emphasis on bread baking. Some special desserts are also studied. Meals are served as in Cooking I.

53. COOKING III. Second year, first semester. Laboratory, four hours. Two semester credits. Prerequisite: Cooking I. Miss Perry.

One-half of the semester is devoted to a study of the principles underlying the preservation of foods, with practice in canning, preserving, and pickling. The latter half of the course is spent in studying foods adapted to certain menus, and developing them into meals which are served in the class.

54. COOKING IV. Second year, second semester. Laboratory, four hours. Two semester credits. Prerequisite: Cooking III. Miss Perry.

The first of the semester's work is a continuation of Cooking III, with special emphasis given to planning and serving of typical farm menus for all occasions. In the second half of the semester practice is given in planning and serving food for large numbers.

61. GENERAL HOUSEKEEPING I. First year, first semester. Recitation three hours. Three semester credits. Miss Green.

Location, heating, lighting and ventilation of the home, rural and municipal water supply and sewage disposal, sanitation of foods, the transmission and prevention of disease, and home care of the sick are studied in this course. Text: *The People's Health*, by Walter Moore Coleman, amplified by class discussions of outside readings.

62. GENERAL HOUSEKEEPING II. First year second semester. Recitation, three hours. Three semester credits. Miss McCoy.

This course includes arrangement and furnishing of the home; buying of supplies, keeping of accounts; planning of household work in relation to efficiency; cleaning; laundering; care of walls and floors. Notebook work is required, together with outside readings.

Special Courses

Special Courses Related to Engineering

Automobile Repair
Tractor Operation
Carpentry
Machine Shop Work
Foundry Practice

Blacksmithing
Telegraphy
Radio Telegraphy
Electrical Repair Work

The following special courses are intended for those who have not the time or the means to take any of the regular engineering courses in the College, but who wish to obtain a practical working knowledge of automobile repair, tractor operation, carpentry, blacksmithing, foundry practice, machine shop work, electrical repair work, telegraphy, or radio telegraphy.

Students can enroll in any of the above courses, except radio, telegraphy and electrical repair work, on the first Monday of any month from September to May. Courses in electrical repair work, radio, and telegraphy begin on the first Monday of January only. The length of the course depends upon the previous training and experience of the individual. Those pursuing courses for tractor operators, blacksmiths, carpenters, foundrymen and telegraphers should arrange to remain at the College two months. The training for auto mechanics, machinists or electricians requires a greater length of time. Students may remain for eighteen weeks if they desire to do so.

There is no charge for tuition, but an incidental fee of \$5 is charged at entrance, as is also a sick benefit fee of \$1, which entitles the student to free medical attendance from the College physician. Laboratory charges to cover the cost of materials used are made in accordance with the following schedule: automobile mechanics, \$10 a month; tractor operators, \$12 a month; blacksmiths, \$12 a month; machinists, \$10 a month; carpenters, \$5 a month; foundrymen, \$5 a month; radio operators, \$5 a month; telegraphers, \$5 a month; and electricians, \$8 a month.

AUTOMOBILE REPAIR. The course in automobile repair includes a thorough study of the construction and assembly of four, six and eight-cylinder engines; the operation, testing and adjustment of these engines; electric ignition, starting, and lighting systems; the automobile chassis, including transmission systems and differentials; tire repair; general repairing, overhauling and operation of automobiles; and sufficient shop work to enable the student to make essential repairs.

Extensive equipment is available, including many types of cars and engines, machine tool tire repair equipment, and electrical equipment. All grades of work are given; the garage mechanic may supplement his knowledge with advanced and specialized work, or the amateur may begin at the bottom and obtain a comprehensive knowledge of the whole field.

TRACTOR OPERATION. The tractor course covers thoroughly the construction, operation and adjustment of all kinds of tractors and their equipment; stationary gas engines; power farm machinery, including tractor hitches; shop work.

About 20 tractors and 35 stationary gas engines are available for the laboratory work in this course, besides great numbers of smaller items of equipment in the way of magnetos, carburetors, and other attachments.

CARPENTRY. A practical study is made of general carpenter work, including the use of carpenters' tools, reading of drawings and blue prints, hand work and machine work, framing, building construction, and form building for concrete.

MACHINE SHOP WORK. The course in machine tool work is designed to meet the demands of those who must prepare themselves in a short time for this line of work. The work is adapted to the needs of the individual student. The entire machine shop of the college is available for this course, which includes a thorough training in the manipulation of lathes, planers, drill presses, boring mills, shapers, and grinding machines.

In order to enable the student to become familiar with both tools and shop processes, the construction of standard gasoline engines and wood lathes is followed, from the machining of the rough castings to the assembly of finished parts. Students may in this way make their own engines and lathes.

FOUNDRY PRACTICE. This course is intended to train practical molders, and includes bench molding with a great variety of patterns, experience with different kinds of sands and facings; open sand work, sweep molding, machine molding, core making, setting of cores, gates and risers, different methods of venting; also general foundry practice.

BLACKSMITHING. A practical course is given in forging operations, such as drawing, welding, bending, twisting, punching iron and steel, the care of forge fire; the making of various tools, such as punches, chisels, drills, scrapers and hammers; hardening, tempering, annealing, case and pack hardening; oxyacetylene and thermit processes of welding.

RADIO TELEGRAPHY. The work, which is intensive, is intended to fit students for commercial work, either on land or on board ships, in the least possible time. The training is similar to that which was used by the College in training radio operators for war service, and consists of instruction in the use of electrical instruments and radio apparatus, and in the use of the international code.

TELEGRAPHY. The great demand for telegraph operators has made it imperative that a number of persons be trained for this work. The course is open to both men and women, who in addition to other work will devote at least four hours a day to sending and receiving. The Morse code will be taught.

ELECTRICAL REPAIR WORK. This course is intended to train electricians, and includes electric wiring, operation of dynamos, motors, and other electrical equipment.

Farmers' Short Course

The Agricultural College offers in agriculture primarily a four-year curriculum, which gives the student fundamental training in the sciences relating to agriculture and their application to the production of crops and livestock and to farming in general. Such a curriculum not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Many men who have chosen farming as their vocation, and who are alive to some of the advantages offered by this institution to the farmers of the State, are denied the opportunity of pursuing the College curriculum in agriculture, or even as much as one year's work in that curriculum. For such men the Agricultural College provides the Farmers' Short Course.

This course is given for a period of eight weeks, practically the months of January and February, each year. It consists of an intensive study of a number of important phases of Kansas agriculture. The scope and nature of the work are indicated by the following outline of the subjects offered:

SUBJECTS IN FARMERS' SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

Soil Management	4(4-0)
Grain Crops	4(3-2)
Forage Crops	4(3-2)
Livestock Production	7(5-4)
Livestock Sanitation	3(3-0)
Advanced Stock Judging.....	2(0-4)
Dairying I.....	5(3-4)
Dairying II.....	5(3-4)
Farm Horticulture	8(6-4)
Poultry Husbandry	3(3-0)
Incubation and Brooding (a).....	3(0-6)
Farm Management	4(3-2)
Beekeeping	6(4-4)
Farm Insects	2(2-0)
Injurious Rodents	2(2-0)
Field Machinery	1(0-2)
Special Lectures	1(2-0)

For each hour of recitation per week usually at least one hour of outside preparation is required. Laboratory or field work requires little or no outside preparation. Each credit (standard for measuring the quantity of work done) represents not less than two hours' work per week for the entire eight weeks of the term. A regular, full-time assignment consists of not less than twenty credits, and students are usually not encouraged to take more than twenty-four credits.

All the work is elective. That is, each student selects, with the advice of members of the faculty, the subjects of his greatest interest or those he feels will do him the most good. Besides studying the subjects heretofore listed, the student may spend one, two or three half-days each week in instruction and practice in carpentry or blacksmithing, or both.

Students desiring further work in farm engineering are referred to "Special Courses Related to Engineering," discussed elsewhere in this

(a) This work is all practice work under supervision. Each student taking the subject must report to the Poultry Farm three times a day, seven days a week.

catalogue. For example, a man may take intensive work for the training of auto mechanics or tractor operators during part or all of the months of September, October, November and December, or during part or all of the months of March, April and May, and during the months of January and February devote himself almost exclusively to Farmers' Short-course work.

It must be noted that Farmers' Short-course work cannot be taken at any other time during the year than during this midwinter, eight-week term. Furthermore, students expecting credit must continue the work for the entire term.

CERTIFICATE

Most students will find it impossible to carry all the Farmers' Short-course work in which they are interested during one eight-week term. Such students are encouraged to take other subjects for a second winter term. Subjects in addition to those already listed may be provided to meet special demands as they arise. A certificate will be granted to each student completing satisfactorily forty credit hours of short-course work.

REQUIREMENTS FOR ADMISSION

This course is intended primarily for mature individuals. High-school work in the State is becoming so general and available to all communities that the demand for short-course work for boys of high-school age is being greatly reduced. Young farmers, not in school, are especially urged to consider the advantages of the Farmers' Short Course. Students over seventeen years of age are admitted without examination.

There is no charge for tuition, but each student is required to pay, on enrollment, an incidental fee of \$3, also a sick-benefit fee of 50 cents. This latter fee entitles him to free medical attendance by the College physician. In several of the laboratories, laboratory deposits varying from 25 cents to \$1 must be made to cover cost of materials used.

SELF SUPPORT

The subjects of this course are primarily practical. They bring the student into actual contact with farm conditions and products. Besides the classroom work, many hours each week are spent in the stock-judging pavilion, laboratory, shop, and barn. This leaves the student but little time for outside labor, and students are therefore advised to come provided with as nearly all the necessary funds for the course as possible.

BRIEF DESCRIPTION OF THE WORK

SOIL MANAGEMENT. (Agron. 3.) In this class the various soil types common in Kansas are studied, especially with reference to their economical management for the production of profitable crops and the maintenance of fertility.

GRAIN CROPS. (Agron. 1.) The work in this subject consists of a practical study of grain-crop production. In the laboratory exercises are given for the identification of different kinds of threshed grain and the determination of damage and market classes and grades.

FORAGE CROPS. (Agron. 2.) This class makes a study of the distribution and production of important forage crops, especially for Kansas conditions. Practical exercises in identification are given in the laboratory.

LIVESTOCK PRODUCTION. (An. Husb. 6.) The work of this class consists of a study and discussion of the elementary but fundamental principles of livestock feeding, breeding, and management. Some attention is given to the history of breeds and pedigrees and to fitting for shows and sales. About three-fourths of the time in the laboratory is devoted to judging various classes and market grades of livestock, and the remainder to demonstrations in the killing, cutting, curing and storing of meats on the farm.

LIVESTOCK SANITATION. (Vet. Med. 1.) This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases are considered.

ADVANCED STOCK JUDGING. (An. Husb. 7.) The work of this class consists largely of the judging of breeding classes of horses, cattle, sheep, and swine. Methods used in judging at county and state fairs are followed. Special attention is given to the selection of foundation stock for purebred herds.

DAIRYING I. (Dairy Husb. 1.) This class considers the general subject of farm dairying, including the composition and properties of milk, the feeding of the dairy cow, the selecting and breeding of the dairy herd, and dairy sanitation. The laboratory provides practical work with the Babcock tester, in the use of the farm separator, and in butter making.

DAIRYING II. (Dairy Husb. 3.) Among the subjects studied and discussed in this class are the following: Keeping records and accounts of dairy-farm business; building up the dairy herd; dairy buildings and equipment; silos and silage; the dairy business and soil fertility; cow-testing associations; coöperative ownership of dairy sires; and detailed plans for the management of the dairy farm. Laboratory work consists of judging dairy cattle from the standpoint of economical production and breed type. Score cards are used for the purpose of making the student systematic and accurate in the selection of dairy animals.

FARM HORTICULTURE. (Hort. 1.) The class work covers vegetable gardening and fruit growing, particular attention being paid to their relation to other farm enterprises. An attempt is made to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is considered. Methods of handling and marketing products are briefly discussed. The laboratory work gives students practice in budding, grafting and other methods of plant propagation, as well as in pruning. Spraying and orchard management are briefly discussed.

POULTRY HUSBANDRY. (Poult. Husb. 1.) The work in Poultry Husbandry covers the practical phases of poultry management, including feeding, breeding, housing, incubation, and brooding.

INCUBATION AND BROODING. (Poult. Husb. 2.) This work is entirely individual practice work, each student carrying through a hatch and brooding the chicks. The student cares for the incubator, tests the eggs, and keeps necessary records. He also has entire care of brooding and feeding the chicks during the most critical weeks.

FARM MANAGEMENT. (Ag. Ec. 1.) In this class the work in the various agricultural subjects is correlated and placed on a practical, workable basis. The principles of farm accounting, distribution of capital, laying out of fields, planning rotations, etc., are given first consideration.

BEEKEEPING. (Ent. 10.) This subject considers the elements of practical beekeeping. The topics discussed include: Life history, behavior and instincts of the honeybee; products of the apiary; and relation of bees to crop production. A study is made of the various bee diseases, together with their treatment. The laboratory exercises consist of practice in constructing hives, supers, brood frames, comb-honey sections, extracting frames, and wiring frames; also of practice in putting in and embedding foundation. Demonstrations are given of various methods of transferring bees, manipulating colonies for swarm prevention and making increase, treatment of brood diseases, and wintering. The object of the work is to give such practical training as will prepare the student to engage successfully in beekeeping.

FARM INSECTS. (Ent. 1.) The serious insect pests of the farm, garden and orchard and those affecting domestic animals are discussed in this class. Methods of control are emphasized and the importance of clean culture and good farm methods is fully considered. Lantern slides are used in some of the presentations.

INJURIOUS RODENTS. (Zool. 1.) In this class a study is made of injurious rodents, especially gophers, prairie dogs, rats, mice, moles and rabbits, emphasizing their habits and the methods of poisoning, trapping, and otherwise destroying them.

FIELD MACHINERY. (Farm Engr. 1.) In this subject practical laboratory work is done by the student, the purpose being to acquaint him with the factors underlying wise selection and proper care of farm machines, as well as with methods of operation of a number of the most important machines. Rope work is given due consideration. Fences and the farm power plant are studied.

SPECIAL LECTURES. It is desirable to have frequent assemblies of all Farmers' Short-course students. Many subjects of timely and special interest cannot be discussed effectively in the regular classes. Two hours each week are set apart to provide these general meetings and opportunity for the presentation of fundamental phases of the work of the course not otherwise provided for. One credit is given for attending these meetings, and every Farmers' Short-course student is urged to enroll. Among the speakers provided will be several members of the College faculty, including the President of the College, and a few outside, well-known agricultural leaders.

Commercial Creamery Short Course

To young men in the State desiring to engage in the creamery business as managers, or as butter or cheese makers, or for those who desire to engage in the business of handling market milk or ice cream the State Agricultural College offers an eight-week course of technical training along these lines. The scope of the work, the nature of its various phases, and the comparative amount of time devoted to each are indicated by the following outline:

SUBJECTS IN COMMERCIAL CREAMERY SHORT COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and laboratory, respectively.

Creamery Management	2(2-0)
Creamery Butter Making	8(4-8)
Market Milk	2(2-0)
Dairy Bacteriology	2(2-0)
Cheese and Ice Cream Making.....	4(1-6)
Judging Dairy Products	1(0-2)
Dairying II (a).....	5(3-4)
Dairy Mechanics and Refrigeration.....	2(0-4)

There is no charge for tuition in this short course. Each student is required to pay on enrollment an incidental fee of \$3, a laboratory charge of \$2.50, and a sick-benefit fee of 50 cents. This latter fee entitles him to free medical attendance by the College physician.

A certificate will be issued to Creamery Short-course students who satisfactorily complete all of the required work outlined above and who show satisfactory evidence of having spent at least six months successfully in actual work in a creamery. Students without this practical experience may acquire it after completing the course. They will then receive their certificate.

Course in Testing Dairy Products

The law of the State requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. A four days' course for cream-station operators is offered at the College during Farm and Home Week to those who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work, and ability to pass the required examination. Applicants are given the opportunity of doing practical work in sampling, testing and grading cream. Lectures are given on points which are necessary for the successful operation of a cream station. A written examination is given on the last day of the course.

Final examinations are regularly held at the College the first Tuesday in each month. Final examinations are also held at various places throughout the State during the year for those who are unable to make the trip to Manhattan. Schedules of these examinations may be had by writing the State Dairy Commissioner, Manhattan, Kan.

(a) This is the same subject as that included in the Farmers' Short Course, and a brief statement of the work included may be found in that write-up.

Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the housekeepers' course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities. This course is given during the first fifteen weeks of each semester.

REQUIREMENTS FOR ADMISSION

Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma. Young women over twenty-one years of age are admitted without examination.

HOUSEKEEPERS' COURSE

Cookery
Sewing
Hygiene

Floriculture
Design in the Home and in Clothing
Housewifery

1. COOKERY. Both semesters. Laboratory, eight hours.

Stoves, stove construction, stove management and fuels are the first topics considered. This discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures, and puddings, and to the canning and preserving of fruits and vegetables. Special attention is given to the planning and serving of meals.

2. SEWING. Both semesters. Laboratory, ten hours.

This course includes practice in hand and machine sewing and dress-making. The fundamental stitches are applied to simple articles and to the repairing of garments. Practice is given in the use of the sewing machine, and in the adaptation of commercial patterns. Suitable materials and trimmings are discussed, and undergarments, a shirt waist and a cloth dress are made. Notebook work is required.

3. HYGIENE. Both semesters. Class work, three hours.

This course takes up the study of elementary hygiene as applied to the individual, the house and the community, with the idea that the prevention of disease is the most important duty of the home nurse. How to give intelligent assistance to the physician and how to contribute to the comfort of the sick are likewise discussed. The ability to recognize and report symptoms correctly, to give baths, to change bedding, to disinfect, and to render first aid in common emergencies in the home are involved.

4. DESIGN IN THE HOME AND CLOTHING. Both semesters. Laboratory, six hours.

This course makes a study of the design principles used in dress and in the problems of the home. Suitable lines and colors for dress are discussed and many practical problems are given. In home decoration the study involves the choice and arrangement of furniture, the choice of wall paper and of rugs, the use of color in the home, and the selection and arrangement of pictures.

5. FLORICULTURE. Both semesters. Class work, two hours.

Lectures in the classroom are supplemented in the greenhouse by practical exercises dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purpose of window gardening, and lawn planting and cutting are discussed in the lectures. An opportunity to become acquainted with the species recommended and with the operations necessary for their successful culture is afforded in the laboratory practice.

6. HOUSEWIFERY. Both semesters. Laboratory, three hours.

This course includes a study of processes and methods in housekeeping.

One-year Curriculum in Lunch-room Management

It is the purpose of this curriculum to offer training to mature women who are fitted by education and ability to carry on some form of lunch-room management. The positions open to such women will be commercial ones only, as the Department reserves the right to recommend only the members of the College institutional classes for positions in educational institutions and hospitals.

The curriculum covers one year, and certificates are granted on the successful completion of the work.

REQUIREMENTS FOR ADMISSION

The curriculum is open to women twenty-five years of age or older. Applications for entrance must be made in writing, and applicants are chosen according to training and ability. The number in the class is limited to twenty, in order to give each member the personal training necessary.

HOW TO APPLY FOR ENTRANCE

A student desiring admission to this curriculum is asked to write a letter, stating her general qualifications and training, to the Dean of the Division of Home Economics. After consideration by the Dean of the Division, the candidates for this course will be chosen.

LUNCH-ROOM MANAGERS' CURRICULUM

Principles of Cookery 4(0-12)	Institutional Cookery 4(1-9)
Food Production and Marketing 3(3-0)	Accounting 2(2-0)
Business English LR 3(3-0)	Lunch-room Management 2(2-0)
Cafeteria Practice LR-I 2(0-6)	Cafeteria Practice LR-II or Tea-room Service 4(0-12)
Sanitation and Hygiene 1(1-0)	Lunch-room Promotion 1, for half semester
Furnishing and Decorating 1(0-3)	Meal Planning 1, for half semester

1. **PRINCIPLES OF COOKERY.** First semester. Laboratory, twelve hours.

The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. This course includes both plain and fancy cookery. A standard system of measurement is taught, and special attention is given to training in accuracy, neatness and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.

2. **FOOD PRODUCTION AND MARKETING.** First semester. Class work, three hours.

The main points in source, production and manufacture of foods are covered. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.

3. **SANITATION AND HYGIENE.** First semester. Class work, one hour.

The sanitary control of eating-houses and food supply, together with the personal hygiene of the worker, are here discussed.

4 and 5. **CAFETERIA PRACTICE LR-I, LR-II.** First and second semesters, respectively. Laboratory, six and twelve hours, respectively.

The purpose of this course is to make the student thoroughly familiar with the cafeteria. Experience is had in serving, checking, and other details.

6. **BUSINESS ENGLISH LR.** First semester. Class work and practice, three hours.

This course is designed to meet the needs of those who are especially preparing themselves to manage lunch rooms. Essential forms of business correspondence, contract forms, the best forms of making and displaying notices and posters, the best current literature in home economics, and well-directed cultural reading are given their proper emphasis.

7. **FURNISHING AND DECORATING.** First semester. Laboratory, three hours.

Color, form and arrangement as applied to wall and floor coverings, furniture, linen, china and silver are studied.

8. **INSTITUTIONAL COOKERY.** Second semester. Class work, one hour ; laboratory, nine hours.

This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.

9. **ACCOUNTING.** Second semester. Class work, two hours.

This is a course in the elements of bookkeeping and of business practice as applied to the accounts of lunch rooms, tea rooms, and cafeterias.

10. **TEA-ROOM SERVICE.** Second semester. Laboratory, twelve hours.

During the second semester the students carry on a tea room in the dining room of the Department. So far as it is practicable, students are given an opportunity to do catering. Careful attention is given to service and cost of maintenance.

11. **LUNCH-ROOM MANAGEMENT.** Second semester. Class work, two hours. The course covers the field organization, equipment, service and general management of lunch rooms.

12. **MEAL PLANNING.** Second semester. Class work, one hour for half the semester.

The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

13. LUNCH-ROOM PROMOTION. Second semester. Class work, one hour, for half the semester.

The purpose of the course is to show the practical application of the principles of advertising and publicity to the enterprises treated in the course in lunch-room management. The several kinds of advertising are taken up in their relation to the lines of business which the students plan to enter. The principles of typographical design as adapted to menu cards and other necessary printed material receive careful attention.

Degrees and Certificates Conferred

In the Year 1918

First Division, May 29, 1918

Degrees Conferred

GRADUATE COURSES

MASTER OF SCIENCE

Florence May Alsop, A. B., University of Kansas, 1915.
Myron Garfield Burton, A. B., Muncie (Indiana) Institute, 1913.
William Patrick Hayes, B. S., Kansas State Agricultural College, 1913.
*Jay Laurence Lush, B. S., Kansas State Agricultural College, 1916.
Roy Ralph Reppert, A. B., Baker University, and B. S., Kansas State Agricultural College, 1915.
Lois Emily Witham, B. S., Kansas State Agricultural College, 1916.

CIVIL ENGINEER

Max Errett Alderman, B. S., Kansas State Agricultural College, 1913.
Casey Cochran Bonebrake, B. S., Kansas State Agricultural College, 1909.
Frederick Berkby McKinnell, B. S., Kansas State Agricultural College, 1908.
James Arthur Nicolay, B. S., Kansas State Agricultural College, 1913.
Ralph Brunt Smith, B. S., Kansas State Agricultural College, 1913.
Ira Earl Taylor, B. S., Kansas State Agricultural College, 1913.
Leon Vincent White, B. S., Kansas State Agricultural College, 1903.

ELECTRICAL ENGINEER

Howard David Matthews, B. S., Kansas State Agricultural College, 1904.
Henry Thomas, B. S., Kansas State Agricultural College, 1904.

MECHANICAL ENGINEER

Ralph Thompson Challender, B. S., Kansas State Agricultural College, 1908.
Elmer Johnson, B. S., Kansas State Agricultural College, 1908.

UNDERGRADUATE CURRICULA

Division of Agriculture

BACHELOR OF SCIENCE IN AGRICULTURE

*James Malcolm Aye	*Merle Warren Converse
Lester Ford Barnes	Lewie Elven Crandall
Frank Harrison Beedle	David Earl Curry
Hobart McNeil Birks	Neil Edwin Dale
*Frank Otto Blecha	William Davis Denholm
Orville Thomas Bonnett	John Elwyn Dubois
Donald Jacobs Borthwick	*John Fredrick Eggerman
William Harrison Brookover	William Raymond Essick
Daniel Madison Bursch	Edward Raymond Frank
Helen Fairbanks Carlyle	William Paul Gaiser
Fred Harrison Carp	George Calvin Gibbons
Edward Albert Clawson	*Benjamin Franklin Griffin
Harry Clifford Colglazier	Ford Haggerty

* In military or naval service.

BACHELOR OF SCIENCE IN AGRICULTURE—*continued*

Albert Cecil Hancock	*Peter Leatherman Netterville
Carl Lawrence Hedstrom	Dean Orr
Douglas Hine	Ira Lewis Plank
Walter Wynne Houghton	*Ernest Henry Ptacek
Charles Otis Johnston	Chester Lee Reeve
Charles Vincent Kershaw	*Carl John Rodewald
Charles Wilbur McCampbell	Loyal Kingsbury Saum
*Donald Eugene MacLeod	Simon Peter Shields
Avery Cleveland Maloney	Joseph Earl Taylor
*George Edwin Manzer	*Lee Richard Thomas
*Ralph Waldo May	Frank Van Haltern
*Samuel Mitchell	Glen Chase Ware
Samuel James Molby	*James Earl Williamson
*Ben Moore	James Walter Zahnley
*Russell Morrison	Herman Henry Zimmerman

DOCTOR OF VETERINARY MEDICINE

Charles Washington Bower	Charles Francis Layton
John Lewis Campbell	Carleton Glen Libby
George Adam Franz	Thomas O'Reilly
Clayton Bronaugh Griffiths	Oskar Willy Felix Paulsen
Nathan Daniel Harwood	Samuel Aker Smith
Walter Harold Hilts	Lyman Ray Vawter
Jackson Benjamin Hinds	David Thomas Wooster
Charles Henry Honeywell	

Division of Engineering

BACHELOR OF SCIENCE IN ARCHITECTURE

*Samuel Edwin Barnes	Lester Gould Hudson
Otto Githens	Theodore Legrand Stuart
Lester Lawrence Howenstine	

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

*Thornton Fleming Bright	Ira Rogers
Robert Kerr, jr.	Frank Miller Sisson
Clyde Cicel Key	Charles Forrest Ziegler

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Leland Golden Alford	Ohmer Roger Miller
*Merrill Augustus Durland	Joseph Lloyd Puckett
*Olind Arthur Hindman	Marshall Howard Russell
Yueu Foo Lim	Wallace Lynn Thackrey
Leroy Nelson Miller	Carey Ray Witham

BACHELOR OF SCIENCE IN FLOUR MILL ENGINEERING

Ralph Glover Mickie

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

James Irwin Brady	Lee Victor Haegert
*William Newton Caton	Ivor Orian Mall
Arthur Douglas	Gustav Peter Toews
Charles Anthony Frankenhoff	

Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Bertha Carolina Anderson	Anna Viola Collins
Maude Strang Anderson	Myrtle Antonia Collins
Ethel May Arnold	Nelle Lucile Cordts
Blanche Baird	Blanche Marie Crandall
Mildred Mary Barackman	Fava Marie Criner
Enid Alta Beeler	Mary Dakin
Lora Hoag Bell	Alice Virginia Dawson
Irma Elizabeth Boerner	Susan Grace Dickman
Flossie Leona Brown	Edith Genevieve Findley
Jennie Pearl Brown	Lenore Josephine Frederickson
Genevieve Vador Bruce	Gladys Elizabeth Gall
Edna Halce Butler	Helen Rae Garvie
Evangeline Casto	Mildred Anna Gettgey
Florence Angela Clarke	Rosalie Syena Godfrey

* In military or naval service.

BACHELOR OF SCIENCE IN HOME ECONOMICS—*continued*

Bess Lenore Gordon	Edith Parkhurst
Kathleen Mildred Hamm	Golda Lucile Rader
Helen Hope Harbaugh	Stella May Rich
Esther Ellene Higgins	Pauline Richards
Gladys Evelyn Hoffman	Edith May Robinson
Evelyn Julia Humphreys	Margaret Robinson
Beatrice Troxell Hurd	Dorothy Skinner
Beulah Amelia Johnson	Gladys Marie Spring
Anna Marie Johnston	Frances Elizabeth Stall
Margaret Belle King	Helen May Stewart
Edith Gertrude Kinman	Ursula Mae Stites
Evelyn Nellie Kizer	Stella Strain
Elizabeth Margaret McCall	Rose Elizabeth Straka
Katharine Hampton McFarland	Girlie Strowig
Lelia Ruth McMurry	Alta Carol Taylor
Gertrude McQuaid	Bess Thomen
Elva Ione Mall	Marcia Elizabeth Turner
Katherine Miller	Mary Belle VanDerveer
Helen Mitchell	Charlotte Pearl Wartenbee
Harriett Plummer Morris	Lelia Faye Whearty
Elizabeth Glenday Mortimer	Julia May White
Comfort Amanda Neale	Nelle Wilkie
Margaret Alice Neiman	Bernice Hale Wise
Bella Marie Nelson	Margaret Joan Worland
Edna Oettinger	

Division of General Science

BACHELOR OF SCIENCE

*Benjamin Francis Barnes	Sarah Katrina Kimport
Lola May Chaffee	Frances Perry
Cecil Orr Chubb	Phillip Hsun Young

BACHELOR OF SCIENCE IN INDUSTRIAL JOURNALISM

Arthur William Boyer	Lillie Elsie Lehman
Edna Lily Boyle	*Leo Clifford Moser
Charles Warren Hestwood	Balford Quintin Shields
Erba Mona Kaul	

Certificates Conferred

CERTIFICATE IN AGRICULTURE

Reuben Anderson	John Edward James
Glen Walter Austin	William Paul Jennings
Herbert John Barr	Olin Smith Jewett
Jacob Bartel	Orval Ernest Jones
Alexis Bervy	Howard Alfred Kissinger
Francis Eugene Botkin	Adolph Dan Mall
Willis Edward Brune	Ernest Jacob Mall
George Leonard Burton	Elmer Ellsworth Murphy
Arthur Clarence Carlson	Fred Lealand Myers
Elmer Joseph Conroy	Henry John Oltjen
Clemens Faeth	George McCellen Pope
Byron Flippo	Max Duane Roberts
George Charles Gehrke	John Searl
Bruce Stoner Gibbs	Albert Edwin Severson
George Harold Graham	George Channing Smith
Harold Graham	Eber Clarine Swanson
Charles Wesley Hagan	Dewey Nelson Turner
Henry Christopher Harries	Glenn Rae Vessey
Edwin Chapin Headley	Mack Allyn Werts
Charles Edward Hill	Frederick Lorence Wiegand
Chester Hiram Hudson	

CERTIFICATE IN CREAMERY SHORT COURSE

Raymond Earl Ambrose	Alva Leland Cade
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CERTIFICATE IN VETERINARY MEDICINE

Elbridge Lee Grubb	Le Roy Noyes
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* In military or naval service.

CERTIFICATE IN STEAM AND GAS TRACTION ENGINES

William Thomas Caldwell	Claude Wesley Shirk
Ernest William Campbell	Albert Everette Sharp
Ralph Harmond Campbell	George Schwab
Guy Calvin Jenkins	Russel Strickler
Gurner Jevons	Frank Wallace True
Claude Leroy Kerr	Gordon Ray Vance
Henry Herman Koopman	Harry Eastman Wood
Charles Orin Lyon	Warren Mack Worrell

CERTIFICATE IN SHOP WORK

Wassiby Michael Boyko

CERTIFICATE IN HOME ECONOMICS

Orva Bell	Grace Keller
Elenor Boyd	Julia Lindstrom
Gladys Hill Davis	Sarah McCoy
Dovie Williams Foster	Ethel Minks
Edwina Gist	Christine Dorothy Roediger
Erie Harmon	Florence Elizabeth Rundell
Laura Georginia Hawkinson	Orra Salmon
Gladys Leah Heasley	Julia Sharp
Sophia Caroline Hummel	Alma Jane Smiley
Alice Adine Johnson	Ethyl Julia Thompkins

CERTIFICATE IN LUNCH ROOM MANAGEMENT

Laura Maud Anthony	Lena Viola Hamilton
Fannie Katherine Konz	Hazel Jean McCormick
Anne Sheaf Davis	Margaret Effie Wood

CERTIFICATE IN MUSIC

Mary Inez Bachman

Second Division, August 8, 1918**Degrees Conferred****Division of Agriculture**

BACHELOR OF SCIENCE IN AGRICULTURE

Percy Le Roy DePuy	Herbert Proudft Miller
Cecil Lyman McFadden	George Willis Rhine

Division of Engineering

BACHELOR OF SCIENCE IN FLOUR MILL ENGINEERING

Herbert John Helmcamp	Paul Le Roy Mann
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Division of Home Economics

BACHELOR OF SCIENCE IN HOME ECONOMICS

Estella May Albin	Nellie Elizabeth Hunt
Florence Willetta Baird	Mary Helen Hunter
Helen Crane	Mayme Adelaide Norlin
Annamae Garvie	Dorothy Elizabeth Norris
Elsie May Griffin	Amanda Christine Olson
Esther Gladys Hilbish	Edna Irene Rawlings
Leona May Hoag	Maud Ernestine Sjolander

Division of General Science

BACHELOR OF SCIENCE

Blanche May Berger	Zenith Mullen
Lulu Maude Berger	Gladys Garnand Rude
John Wirt Blachly	Eva Emmaline Wood
Ruth Lyon	

Honors

SENIOR HONORS

(May, 1918)

DIVISION OF AGRICULTURE

Fred Carp	Charles Otis Johnston
Walter Wynne Houghton	James Walter Zahnley

DIVISION OF ENGINEERING

Merrill Augustus Durland

DIVISION OF HOME ECONOMICS

Edna Halce Butler	Helen May Mitchell
Susan Grace Dickman	Stella Strain

DIVISION OF GENERAL SCIENCE

Benjamin Francis Barnes	Frances Perry
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JUNIOR HONORS

(May, 1918)

DIVISION OF AGRICULTURE

Fred Robert Beaudette	Arthur Leroy Myers
Blanch Shirley French	

DIVISION OF ENGINEERING

Iomer Cross	John Stephen Painter
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DIVISION OF HOME ECONOMICS

Marella Lucile Herrick	Frances Elizabeth Russell
Alpha Corrine Latzke	Vera Oviatte Olmstead
Esther Naomi Latzke	

DIVISION OF GENERAL SCIENCE

Earl Lily Miltner	Nettie May Wismer
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PHI KAPPA PHI

(Class of 1918)

Benjamin Francis Barnes	Lenore Josephine Frederickson
Mid Alta Beeler	Otto B. Githens
Robert McNeil Birks	Walter Wynne Houghton
Frank Otto Blecha	Lester Gould Hudson
Lyville Thomas Bonnett	Charles Otis Johnston
Edna Halce Butler	Helen May Mitchell
Fred Carp	Frances Perry
Anna Viola Collins	Marshall Howard Russell
Merle Warren Converse	Frances Elizabeth Stall
Larry Dakin	Helen May Stewart
Susan Grace Dickman	Stella Strain
Merrill Augustus Durland	James Walter Zahnley

List of Students

Graduate Students

CANDIDATES FOR MASTER'S DEGREE, 1919

- Stella Maude Harriss, B. S. 1917 (Kansas State Agricultural College), *Chemistry*
Fairbury, Neb.
William Preston Tuttle, B. S. 1915 (University of Kentucky), *Agriculture*
Manhattan
William Hiddleson Andrews, A. B. 1900 (University of Chicago), *Education*
Manhattan

GRADUATE STUDENTS WORKING TOWARD MASTER'S DEGREE

- Thomas Arthur Case, B. S. 1912 (Kansas State Agricultural College), *Education*
Sterling
Martha Livingston Denny, A. B. 1917 (University of Indiana), *Zoölogy*
Manhattan
Frank Elmer Fox, B. S. 1915 (Iowa State College), *Chemistry*
Manhattan
Josephyne Lura Gilmore, B. S. 1913 (Kansas State Agricultural College), *Chemistry* and
Bacteriology
Manhattan
Ruth Evalyn Hurd, B. S. 1918 (Carthage College), *Zoölogy*
Manhattan
Louis Edgar Hutto, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
Manhattan
Ernest Baker Keith, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
Manhattan
Helen Mitchell, B. S. 1918 (Kansas State Agricultural College), *Chemistry*
Manhattan
Harold Arthur Pratt, B. S. 1917 (Massachusetts Agricultural College), *Zoölogy*
Shrewsbury, Mass.
Esther Boell Smith, B. S. 1914 (Kansas State Agricultural College), *Chemistry*
Riley
Edward Staunton West, A. B. 1917 (Randolph Macon College), *Chemistry*
Stuart, Va.
James Walter Zahnley, B. S. 1918 (Kansas State Agricultural College), *Education*
Manhattan

GRADUATE STUDENTS NOT WORKING TOWARD MASTER'S DEGREE

- Harry Colglazier, B. S. 1918 (Kansas State Agricultural College), *Mathematics*
Larned
William Davis Denholm, B. S. 1918 (Kansas State Agricultural College), *Mathematics*
Tonganoxie
Percy Le Roy DePuy, B. S. 1918 (Kansas State Agricultural College), *Agriculture*
Manhattan
Odessa Della Dow, B. S. 1906 (Kansas State Agricultural College), *Chemistry*
Manhattan
Percy Leigh Gainey, B. S. 1908 (North Carolina College of Agriculture and Mechanic
Arts); M. S. 1910 (ibid.); A. M. 1911 (Washington University), *Chemistry*
Manhattan
Samuel Ray Gardner, B. S. 1917 (Kansas State Agricultural College), *Agriculture*
Hartford
William Patrick Hayes, B. S. 1913; M. S. 1918 (Kansas State Agricultural College),
Modern Languages
Manhattan
Grace Roberta Hesse, A. B. 1917 (University of Michigan), *Music*
Ann Arbor, Mich.
Nellie Elizabeth Hunt, B. S. 1918 (Kansas State Agricultural College), *Botany*
Manhattan

- Edith Jones Iles, B. S. 1909 (Kansas State Agricultural College), *Modern Languages*
Manhattan
- William Adams Lippincott, A. B. 1903 (Illinois College); B. S. 1911 (Iowa State College); M. S. 1917 (University of Wisconsin), *Zoology*
Manhattan
- Mary Mattie McDonald, Ph. B. 1916 (University of Chicago), *Modern Languages*
Lerna, Illinois
- Alta Cooper Pickett, B. S. 1917 (Kansas State Agricultural College), *Home Economics*
Olathe
- Malcolm Cameran Sewell, B. S. 1912 (Kansas State Agricultural College); M. S. 1914 (Ohio State University), *Chemistry*
Manhattan
- Theodore Legrand Shuart, B. S. 1918 (Kansas State Agricultural College), *Architecture*
Hutchinson
- Frank Van Haltern, B. S. 1918 (Kansas State Agricultural College), *Zoology*
Manhattan
- Glen Chase Ware, B. S. 1918 (Kansas State Agricultural College), *Zoology*
Manhattan
- Lois Emily Witham, B. S. 1916; M. S. 1918 (Kansas State Agricultural College),
Modern Languages
Manhattan
- Mary Dunlap Ziegler, B. S. 1916 (Kansas State Agricultural College), *Home Economics*
Eureka

Undergraduate Students

The following list includes seniors, juniors, sophomores, freshmen and special students in the College. For students in the Summer School and in special courses, see lists following this one.

Abbreviations here used denote curricula as follows: Ag, agriculture; AE, agricultural engineering; Ar, architecture; CE, civil engineering; EE, electrical engineering; FME, flour mill engineering; GS, general science; HE, home economics; IJ, industrial journalism; ME, mechanical engineering; and VM, veterinary medicine. SpAg, SpEng, SpGS, SpHE, SpM and SpVM denote special students in agriculture, engineering, general science, home economics, music, and veterinary medicine, respectively.

SENIORS

- | | |
|--|---|
| Alto Mae Adams (HE); Lyons | Solomon Richard Brinker (GS); |
| Elizabeth Adams (HE); Maple Hill | Greensburg, Pa. |
| Edwin Adece (CE); Manhattan | Ravena Elizabeth Brown (HE); Lawrence |
| Ruth Helen Allen (HE); Elmdale | Margaret Sara Browne (HE); Burdette |
| James Bell Angle (Ag); Courtland | Kathryn Velma Browning (HE); Chanute |
| Harry Jonas Austin (VM); Manhattan | Mildred Browning (HE); Linwood |
| Madge Gladys Austin (HE); Manhattan | Lloyd Harmon Bunnell (AE); Iola |
| Turner Barger (Ag); Protection | Phyllis Harriet Burt (HE); Eureka. |
| Ivyl Constantine Barker (IJ); Newton | Lois Ava Burton (HE); Emporia |
| Hugh Donald Barnes (CE); Blue Mound | Lucile Margaret Carey (HE); Manhattan |
| Carrol Mueller Barringer (Ag); | Frank Swartz Campbell (GS); Manhattan |
| Conover, N. C. | Velma Lenore Carson (IJ); Clifton |
| Arthur Esco Bate (VM); Wichita | Quinta Pearl Cates (HE); Manhattan |
| Fred Robert Beaudette (VM); Wichita | Imogene Marjorie Chase (GS); Manhattan |
| Edna Louise Beckman (HE); Manhattan | John Clarke (Ag); Manhattan |
| Walton Bell (Ag); Beattie | Russell Fesler Coffey (VM); Iola |
| Gladys Bergier (HE); Manhattan | Jesse Alfred Cook (EE); Eureka |
| Mildred Content Berry (HE); Jewell | Nadia Dunn Corby (IJ); Manhattan |
| Trafford William Bigger (ME); Topeka. | Elizabeth Agnes Cotton (GS); Wamego |
| Edith Frances Biggs (HE); El Vado, N. M. | Mary Ita Covert (HE); Manhattan |
| Mary Avis Blain (GS); Manhattan | Catherine Aleph Christman (HE); Wichita |
| George Yoeman Blair (Ag); Mulvane | Vernon Simpson Crippin (Ag); Langdon |
| Ruth Blair (HE); Hutchinson | Homer Cross (EE); Wichita |
| Helen Willamine Blank (HE); Emporia | Margaret Elizabeth Crumbaker (HE); |
| Sarah Anna Boell (GS); Riley | Onaga |
| Payne Vera Bondurant (HE); Ness City | May Grace Crumbaker (HE); Onaga |
| Ruth Borthwick (HE); Manhattan | Charles Elbert Curtis (GS); Manhattan |
| Bruce Brown Brewer (IJ); Manhattan | Nora May Dappen (GS); Ramona |

UNDERGRADUATE STUDENTS—SENIORS—*continued*

- Florence Lillian Dial (HE); Manhattan
 Hattie Estella Droll (HE); Wichita
 Minnie Josephine Dubbs (HE); Ransom
 Lenore Maria Edgerton (HE); Randolph
 Ruby Anna Ellerman (HE); Potter
 Charles Ranger Enlow (Ag); Manhattan
 John Franklin Erdley (VM); Holton
 Siebert Fairman (ME); Manhattan
 Maurine Fitzgerald (HE); Colby
 Beatty Hope Fleenor (GS); Manhattan
 Bertha Edna Flynn (HE); Humboldt
 George Albert Foltz (GS); Oswego
 William Thornton Foreman (EE); Kiowa
 Abijah Wilcox Foster (Ag); Fairchild, Wis.
 Blanch Shirley French (Ag); Hamilton.
 Murl Gann (HE); Springfield, Mo.
 Marie Gehr (HE); Manhattan
 Hattie Pauline Gesner (HE); Kiowa
 Helen Isabell Gott (HE); Arlington
 Edwin Edgar Gottman (Ag); Kansas City
 Greta Hazel Gramse (HE); Perry
 Fred Griffie (Ag); Winifred
 Joe Cunningham Gullede (Ag); Manhattan
 Myrtle Annice Gunselman (HE); Wakefield
 Mary Frances Haack (HE); Florence
 Edith Theodora Hall (HE); Okmulgee, Ok.
 Lucile Halleck (HE); Abilene
 Gordon Wilfred Hamilton (ME); Salina
 Frank King Hansen (VM); Manhattan
 Alice Tibbetts Harkness (HE); Lakin
 Eva Harvey (HE); Osborne
 Helen Lucile Heiser (HE); Tonganoxie
 Ruth Bernese Henderson (IJ); Alma
 Alta Sarah Hepler (HE); Manhattan
 Sarella Lucile Herrick (HE); Topeka
 Earl Martin Hiestand (Ag); Yates Center
 Clara Higgins (Ag); Hiawatha
 Orin Willard Hinshaw (Ag); Eureka
 Ruth Kathrina Huff (HE); Chapman
 Stanley Paul Hunt (ME); Marysville
 Elijah Harrison Ikard (VM); Manhattan
 William Curtis Janssen (Ag); Lorraine
 Gussie Christina Johnson (HE); Wichita
 Myron Ernest Johnson (Ar); Olathe
 George Albert Kauffman (ME); Coffeyville
 Julia Annette Keeler (IJ); Luray
 † Philip Alexander Kennicott (GS);
 Woodbine
 Maude Emily Kershaw (HE); Garrison
 Robert Warren Kilbourn (Ag); Sterling
 Mary Elvessa Kirkpatrick (HE);
 Holdrege, Neb.
 Evaline Virginia Kramer (HE);
 Washington
 Dan Glenn Lake (ME); Lake City
 Alpha Corrine Latzke (HE); Manhattan
 Esther Naomi Latzke (HE); Manhattan
 Lavinia Leibengood (HE); Paola
 Mildred Kelly Levi (HE); Olathe
 Howard Allyn Lindsley (Ag); Manhattan
 Lucille Carol Logan (HE); Lyons
 Olive Charlotte Logerstrom (HE);
 Manhattan
 Effie Evelyn Lyons (HE); Topeka
 Coleman White McCampbell (Ag);
 Corpus Christi, Tex.
 Glenn Worth McCracken (EE); Manhattan
 Helen McClrath (HE); Manhattan
 Ernest Lee McIntosh (Ag); Manhattan
 Irma Ellen McKinnell (HE); Maize
 Robert Donald MacGregor (GS); Topeka
 John Long MacNair (Ag); Holmdel, N. J.
 Carl Vincent Maloney (Ag);
 Kalamazoo, Mich.
 Marie Manser (HE); Burden
 Edgar Martin (Ag); Siloam Spgs., Ark.
 Mary Aletha Mason (HE); Belle Plaine
 Elizabeth Cora May (HE); Holton
 Lora Gertrude Mendenhall (HE);
 Fairbury, Neb.
 George Aaron Miller (ME); Portis
 Pearl Lily Miltner (GS); Wichita.
- Florence Eleanor Mitchell (HE);
 Kansas City, Mo.
 Mary Ethel Mitchell (HE); Hymer
 Clara Belle Moore (HE); Holton
 Hilda Ruth Moore (HE); Winfield
 Laura Dwelle Moore (IJ); Chanute
 Ruth Ann Morgan (HE); Neodesha
 Alice Morton (GS); Ellsworth
 Manoog Muguerditch Muguerditch (Ag);
 Manhattan
 Clifford Howard Myers (ME); Hutchinson
 Elinor Frances Neal (HE); Topeka
 Ralph Dale Nichols (Ag); Scranton
 Lettie Maybelle Noyce (HE); Stockton
 Howard O'Brien (VM); Luray
 Vera Oviatte Olmstead (HE); Moran
 Ruth Elizabeth Orr, (HE); Manhattan
 John Stephen Painter (EE); Beverly
 Blanche Marguerite Palmer (GS);
 Sterling, Colo.
 Flora Roccena Parker (GS); Ottawa
 Roy Reece Parker (VM); Clearwater
 Helen Boyd Petrie (GS); Horton
 Ruth Rosabell Phillips (HE); Ottawa
 Lael Louise Porter (HE); Deadwood,
 S. Dak.
 Everett Jacob Price (Ag); Baileyville
 Floyd Meredith Pickerell (Ag); Manhattan
 Leo Dewey Ptacek (Ag); Emporia
 Charles Lorin Quear (Ag); Manhattan
 Evan Hart Richardson (VM); Circleville
 Louis Vernon Ritter (Ag); Memphis, Tenn.
 Lloyd William Roberts (OE); Pomona
 Louis Henry Rochford (Ag); Osborne
 Maybell Rodgers (HE); Cherryvale
 Clifford Rude (GS); Council Grove
 Frances Elizabeth Russell (HE); Scott City
 Vera Leone Samuel (HE); Paola
 Addie Ruth Sandman (GS); Harbine, Neb.
 August Ernest Schattenburg (VM);
 Manhattan
 Herbert Gordon Schultz (EE); Manhattan
 Adelaide Seeds (HE); Topeka
 Nellie Gladys Shoup (HE); Mulvane
 Lola Mae Sloop (HE); Manhattan
 Eva Jeanette Snyder (HE); Sterling
 Millie Oltmanns Stein (HE); Halstead
 Esther Elizabeth Stonge (HE); Riley
 Arthur Fretchhof Swanson (Ag); Norcatur
 Ethel Gladys Switzer (HE); Emporia
 Hazel Dora Taylor (GS); Winfield
 Mary Fidelia Taylor (GS); Newton
 Ruth Georgia Taylor (HE); Tyro
 Edith Reed Teague (HE); Genoa, Ill.
 Ruth Elizabeth Thomas (HE); Anthony
 Lawrence Artman Tilton (ME); Garrison
 Gertrude Uhley (HE); Fairbury, Neb.
 Gail Maurice Umberger (VM); Elmdale
 Aurelyn Agnes Vandivert (HE);
 Iowa City, Iowa
 Myrtle Cornelia Vanderwilt (HE); Solomon
 Ralph Andrew VanTrine (EE); Salina
 Elizabeth Doris Wadlev (IJ); Manhattan
 Martha Coats Webb (HE); Caney
 Ralph Scoles Westcott (Ag); Galena
 Carl Wettig (Ag); Valley Falls
 Edwin Frederick Whedon (Ag); Oswego
 Hazel Merillat Williams (HE); Enterprise
 Errol Thomas Williamson (EE);
 Independence, Mo.
 Homer Bryan Willis (Ag); Manhattan
 Edythe May Wilson (HE); Luray
 Frank Wilson (Ag); Manhattan
 Marian Opal Wishard (HE); Emporia
 Nettie May Wismer (GS); Pomona
 Nellie Flo Yantis (GS); Garrison
 Sara Chase Yost (IJ); Manhattan
 Frank Young (Ag); Falfurrias, Tex.
 Charles Edward Zollinger (VM);
 Junction City
 Fred Frank Young (Ag); Pendennis

† In Tractor Operator Short Course, second semester.

JUNIORS

Genevra Mae Adams (HE); Atchison
 Mabel Christmas Adams (HE); Garden City
 Ida Gertrude Adey (GS); Manhattan
 Boyd Funston Agnew (Ag); Yates Center
 James Sidney Allen (VM); Richmond, Utah
 Francis Frank Anderson (ME); Wichita
 John Wendell Andrews (GS); Manhattan
 Mildred Jeanette Arends (HE);
 Kansas City
 Ray Allen Axtell (Ag); Dimmitt, Tex.
 Emmett Stanley Bacon (VM); Emporia
 Helen Hunt Bales (HE); Manhattan
 John William Barker (GS); Pratt
 Louis Bloyce Bate (VM); Wichita
 Thomas Baumgartner (Ag); Manhattan
 Esther Grace Bayles (HE); Manhattan
 Helen Cecile Beck (HE); Topeka
 Clyde Beckett (CE); Eldorado
 Adelaide Evelyn Beedle (HE); Salina
 Mabel Rose Bentley (GS); Valhalla
 Elmo Murray Berroth (VM); Arkansas City
 Everett Allen Billings (Ag); Maple Hill
 Bertha Johanna Biltz (HE); Lindell
 Nelson Boyle (Ag); Spivey
 Katherine Marie Brandner (HE); Everest
 Alden Branine (GS); Newton
 Bernard Bailey Brookover (Ag); Eureka
 Guy Mahlon Brown (ME); Manhattan
 Joseph Oscar Brown (Ag); Sanford, Fla.
 Clarence Leland Browning (EE);
 Manhattan
 Arthur Newton Burditt (Ag); Ness City
 Elizabeth Burgner (HE); Burlington
 Bessie Catherine Burdick (HE); Ottawa
 Walter Bryan Carey (ME); Hutchinson
 Harold Scott Carothers (Ag); Peabody
 Roy Edward Carr (GS); Oakley
 Hettie Carris (HE); Topeka
 Maude Ellen Carter (HE); Tonganoxie
 Dora Lydia Cate (IJ); Manhattan
 Vera Cates (HE); Manhattan
 Elizabeth Duncan Circle (GS); Kiowa
 Sylvan Harold Coffman (Ag); Chase
 Frank Harold Collins (GS); Wellsville
 Sarah Alda Conrow (HE); Manhattan
 Joseph Hamilton Cool (Ag); Glasco
 Warren Eugene Crahtree (Ag); Manhattan
 Doris Mildred Crandall (HE); Manhattan
 Ruby Louise Crocker (IJ); Matfield Green
 Elsie Guthbert (HE); Topeka
 May Dahnke (HE); Manhattan
 Verla Lucille Dahnke (HE); Manhattan
 Bertha Lewis Danheim (HE); Blue Rapids
 Helen Josephine Dawley (HE); Waldo
 Louise Dawson (GS); Clifton, Ariz.
 William Marion Dicke (VM); Louisburg
 Lulu Elizabeth Deist (HE); Harper
 Laura Viola Denman (GS); Manhattan
 Charles Boddie Downer (EE); Kansas City
 Vinnie Drake (HE); Manhattan
 George Milton Drumm (Ag); Manhattan
 H. Myers Duphorne (EE); Sharon Springs
 Hazel Viola Dyer (HE); Oberlin
 Theodore Henry Enns, jr. (IJ); Inman
 Sivert Eriksen (VM); Kensal, N. Dak.
 Margaret Salina Etzold (HE); Liberal
 Mabel Lena Evans (HE); Liberal
 Hobart Fairman (ME); Manhattan
 Paul Lowell Fetzer (ME); Manhattan
 Ina Ruth Findley (GS); Manhattan
 Agnes Eloise Flanders (HE); Westboro, Mo.
 William Robert Folck (EE); Little River
 William Edward Forney (GS);
 Cottonwood Falls
 Goodner Estelle Forsythe (HE); Joplin, Mo.
 Ralph Emerson Franklin (EE); Horton
 Harry Lee Frieze (VM); Concord, N. C.
 Earl Wesley Frost (GS); Blue Rapids
 Gladys Lorena Gansbird (HE); Manhattan
 Ruth Emma Gardenhire (HE); Alma
 Ethel Victoria Garrett (HE); Manhattan
 Isaac Frank Gatz (VM); McPherson
 Lester Frank Gfeller (EE); Junction City
 Laberta Ruth Ghormley (HE); Hutchinson
 Grace Iola Gish (GS); Manhattan
 Bertha Elizabeth Glenn (HE); Manhattan
 Ruth Stephens Goodrum (HE); Lamar, Mo.
 Mary Ruth Gorham (HE); Garden City
 John Francis Grady (CE); Lansing
 Glenn Griffith (Ag); College Springs, Iowa
 Mamie Grimes (HE); Manhattan
 Dora Eva Grogger (HE); Manhattan
 Harold Reed Guilbert (Ag); Wallace
 John Spence Gullledge (EE);
 Siloam Springs, Ark.
 Irene Mott Guthrie (HE); Herington
 Eva Maud Gwin (HE); Morrowville
 Mary Elizabeth Hagenbuch (HE); Troy
 Marie Hammerly (HE); Manhattan
 Lois Margaret Hanna (GS); Clay Center
 Claude Gustave Hansen (ME); Sedgwick
 Ruth Anna Harding (HE); Marion
 Floyd Hawkins (IJ); Manhattan
 Marie Ellen Haynes (HE); Emporia
 Jessie Gladys Hibler (HE);
 Springfield, Mo.
 Harry Bernice Hickman (VM);
 Norton, Mo.
 Glenn Frank Hicks (Ag); Norton
 Mary Jane Hill (HE); Burlington
 Russell Dean Hilliard (EE);
 Westmoreland
 George Winfred Hinds (Ag); Manhattan
 Mary Hitch (HE); Guymon, Okla.
 Ralph Ward Hixon (VM); Hiawatha
 Lester Hoffman (GS); Abilene
 Edna Letha Hoke (HE); Manhattan
 Samuel Willet Honeywell (EE); Poe
 Hazel Dell Howe (HE); Garrison
 Stuart Laverne Hunt (VM); Blue Rapids
 Azel Lemon Husted (Ag); Codell
 Claude Elton Hutto (GS); Manhattan
 Jane Jenkins (HE); Boulder, Colo.
 Helen Myrtle Johnson (HE); Wichita.
 Samuel Ray Johnson (VM);
 Blanchard, Iowa
 Mary Catherine Johnston (HE); Gardner
 June Marie Julian (HE);
 Wood River, Neb.
 Elithe Electa Kaull (GS); Glen Elder
 George Lowell Kelley (Ag); White Cloud
 Clare Kimport (Ag); Dellvale
 Amanda Kirkpatrick (HE); Montrose
 Ruth DeVerre Knapp (HE);
 Kansas City, Mo.
 Clifford Kniseley (ME); Eldorado
 Ernest Lester Lahr (Ag); Abilene
 Clay Forrest Laude (Ag); Rose
 Helen Unetta Lawrence (HE);
 Junction City
 Anne Marie Lorimer (HE); Olathe
 Gladys Love (HE); Kansas City, Mo.
 Frances Evelyn Lovett (HE); Eureka
 Merle James Lucas (EE); Pratt
 Bessie Lenore Lyman (HE); Manhattan
 Eugene Sidney Lyons (Ag); Lawrence
 Herbert William McClelland (GS);
 Manhattan
 Anna Leah McIntyre (HE); Topeka
 Leo Alphonsus Magrath (VM);
 Williamsburg
 Mabelle Thornburg Marble (GS);
 Manhattan
 Tressie Edna May (HE); Manhattan
 Calvin Medlin (IJ); Manhattan
 Josephine Alta Meldrum (HE); Cedar Vale

UNDERGRADUATE STUDENTS—JUNIORS—*continued*

Velma Mae Meserve (HE); Ellis
 Adda Middleton (HE); Minneapolis
 Carl Patterson Miller (IJ); Belleville
 Lloyd Rayburn Miller (CE); Belleville
 Nina Irene Miller (HE); Neodesha
 Florence Irene Mirick (HE); Otis
 Isaac Tennyson Mock (VM); Idana
 John Delmont Montague (Ag); Anthony
 Harry Alyson Moore (IJ); Manhattan
 Eloise Morrison (HE); Topeka
 Mollie Smith Moser (HE); Westphalia
 Edith Mabel Muir (HE); Salina
 Joseph Linn Mullen (Ag); Clay Center
 Barbara Elizabeth Murray (HE);
 Ash Grove, Mo.
 Anna Belle Neal (GS); Topeka.
 Phillip Earl Neale (Ag); Manhattan
 Helen Isabel Neiman (HE); White Water
 Ralph Damen Nixon (Ag); Council Grove
 Blanche Noll (GS); Manhattan
 Floyd Earl Oakes (Ag); Gypsum
 Edlena O'Neil (HE); Quindaro
 Ruby Elizabeth Orth (GS); Manhattan
 Reeves Ayers Osborne (Ag); Burrton
 Nellie Maria Payne (GS); Manhattan
 Nevels Pearson (Ag); Manhattan
 Hervey Phipps (VM); Pueblo, Colo.
 John Kent Pike (EE); Chanute
 Doris Hawthorne Prickett (HE); Wamego
 Edna Winifred Pyle (HE); Morrill
 Abner Harvey Quinn, jr. (VM);
 Creston, Iowa
 Harold Quinn (VM); Aurora, Neb.
 Roland Culler Ragle (GS); Coffeyville
 Phoebe Frances Rebstock (HE); Newton
 Garnett Workman Reed (GS);
 Kansas City, Mo.
 Eugene Taylor Reel (Ag); Labette
 Winfield John Ritter (VM); Parsons
 Ruby Maude Roberts (HE); Lyons
 Ada LaVerne Robertson (HE);
 Washington
 William Ellet Robison (Ag); Towanda
 Carl Otto Roda (Ag); Paradise
 Walter William Rodewald (Ag); Vassar
 Anna Marie Roenigk (HE); Morganville
 Amanda Christina Rosenquist (HE);
 Osage City
 Lenora Olive Rude (GS); Manhattan
 Winfield Foster Runyen (Ag); Topeka
 Charlotte Frances Russell (IJ); Winfield
 Frank Louis Sahman (EE); Lincoln
 Blanche Martha Sappenfield (GS);
 Clifton
 Jewell Dan Sappenfield (GS); Clifton
 Luella Mabel Clara Schaumburg (Ag);
 La Crosse
 Merrill Philip Schlaegel (VM); Vermillion
 George William Schmidt (Ag); Jet. City
 Eliza Lucretia Scholer (HE); Milo.
 Harry Kenneth Shideler (AE); Girard
 Laura Edna Shingledecker (IJ);
 Manhattan
 Grover Meeker Simpson (VM); Salina
 Louis Vallieres Skidmore (VM);
 Manhattan
 Helen Slavens (HE); Kansas City, Mo.
 Grace King Smith (HE); Le Roy
 James Campbell Snapp (Ag); Manhattan
 James Sparks (ME); Kiowa
 Jay Erskine Stanton (VM); Manhattan
 Christine Stebbins (HE); Columbus
 Wesley Stevens (EE); Great Bend
 Helen Stimson (HE); Greeley, Colo.
 Ella Belle Stinson (HE); Kansas City
 Thomas Granville Storey (EE); Freeport
 Josephine Sullivan (HE); Wamego
 Theodore Thomas Swenson (Ag);
 Lindsborg
 Charles Swingle (Ag); Manhattan
 Ray Selden Talley (Ar); Harper
 Brainard Louis Taylor (VM);
 Arkansas City
 Leona Emma Teichgraeber (HE);
 Lindsborg
 Donald Cheney Thayer (Ag); Manhattan
 Kyle David Thompson (Ag); Densmore
 Nellie Agnes Thornburg (IJ); Jetmore
 Francis Totten (Ag); Beattie
 Carl Fenton Trace (Ag); Cartersville, Mo.
 Mabel Troutfetter (GS); Colby
 William Tully Turnbull (GS); Manhattan
 William Ira Turner (Ag); Milton
 Keen Umbehr (CE); Alma
 Mark Florea Upson (Ag); Sabinal, Tex.
 Ethel Varner (HE); Augusta
 John Luther Armon Wainscott (Ag);
 Hazelton
 Edith Grace Wakefield (HE); Culver
 Arthur Walker (GS); Manhattan
 Albert Neal Waters (Ag); Blue Rapids
 Merrill Worthing Watt (Ag); Topeka
 Sybil June Marie Watts (HE); Winfield
 Laverne Webb (HE); Cedarvale
 Francis George Welch (Ag); Hartford
 Bula Mae Wertenberger (HE); Manhattan
 Winifred West (HE); Kinsley
 Edith Marie Wheatley (HE); Rosedale
 Elizabeth Whetstone (HE); Pomona
 Brenner Bagnall White (VM); Delphos
 Emma Whitton (GS); Kiowa
 Andrew Wilbur Wilcox (GS); Manhattan
 Alma Luella Wilkin (HE); Aulne
 Edna May Wilkin (HE); Aulne
 Faye Williams (HE); Gardner
 Harbard Stephen Wise (Ag); Wichita
 Homer Carleton Wood (Ag); Manhattan
 Harold Stephen Woodard (Ag); Glen Elder
 Jay Lester Woodhouse (GS);
 Sharon Springs
 Margaret Woodman (IJ); Manhattan
 Floyd Wayne Work (ME); Windom
 Clark Works (Ag); Humboldt
 Helen Louise Yates (GS);
 Kansas City, Mo.
 Theodore Franklin Yost (Ag); La Crosse
 Fay Aileen Young (HE); Le Roy

SOPHOMORES.

Earl G. Abbott (EE); Garden City
 Kathryn Ruth Adams (HE); Manhattan
 Gladys Virginia Addy (HE); Manhattan
 Clarence Eugene Agnew (Ag);
 Yates Center
 Harry Whitford Alexander (CE);
 Manhattan
 George Clarence Anderson (Ag); Bronson
 Esther Etta Andrews (HE); Manhattan
 Ardis Corinne Atkins (HE); Manhattan
 Minnie Aurora Augustine (HE); Ames
 Charlotte Hosier Ayers (HE); La Harpe
 Frank Bailey (Ag); Moundville, Mo.
 Harriett May Baker (GS); Emporia
 Jeanne Anderson Baker (GS); Enterprise
 Florence Banker (HE); Lawrence
 Paul Willis Barber (GS); Bluff City
 Edra Marie Barnes (HE); Rock Creek
 Harry Raymond Barnes (Ag);
 Rocky Ford, Colo.
 Fred La Grange Bartlett (VM);
 Huntington, Ind.

UNDERGRADUATE STUDENTS—SOPHOMORES—*continued*

- Homer Glen Beatty (AE); Luray
 Fanny Belle Beggs (HE); Washington
 William Bergh jr. (GS); Newton
 Ernestine Biby (HE); Topeka
 Lindley Charles Binford (CE); Haviland
 Anna Maude Blackwell (HE); Manhattan
 Paul Thomas Blakey (ME); Cheney
 Joseph Alvin Bogue (VM); Manhattan
 Fred William Boyd (Ag); Joplin, Mo.
 Viola Margaret Brainerd (HE); Paola
 Henry Howard Braum (Ag); Denison
 Roy Shipman Breese (EE); Manhattan
 Marian Bretch (HE); Hobart Okla.
 Clare Howard Brown (IJ); Onaga
 Elsa Ann Brown (HE); Manhattan
 John Farr Brown (Ag); Toronto
 Paul Shannon Brown (Ag); Holton
 Albert Joseph Brubaker (ME); Ellsworth
 Charles Pratt Brubaker (ME);
 New Cambria
 Consuelo Bullock (HE); Conway Springs
 Holman Lynn Bunger (Ag);
 Wheat Ridge, Colo.
 George Hoffman Bush (EE); Little River
 Georgianna Bush (GS); Little River
 Morgan David Bush (GS); Douglas
 Gladys Elizabeth Bushong (GS);
 Manhattan
 Rex Dean Bushong (VM); Manhattan
 Helen Merle Calkins (HE); Burlingame
 Jamie Irene Cameron (HE); Manhattan
 Ruby May Canaday (HE); Mulvane
 Myrtle Carey (HE); Houston, Texas
 Frank Carr (FME); Manhattan
 Gladys Beatrice Carson (HE); Liberal
 Victor Hugo Casad (CE);
 Mooreland, Okla.
 Deloss Chapin (Ag); Manhattan
 James Childers (Ar); Wamego
 Ray Samuel Circle (Ag); Kiowa
 Benjamin Finley Clapham (VM); Lane
 Ericile La Vetta Clark (GS); Hutchinson
 Marian Cecile Clarke (GS); Paola
 Charles H. Cloud (Ag); Winfield
 Sylvester Jay Coe (Ag);
 St. Augustine, Fla.
 John Parke Colburn (CE); Dodge City
 Harry Hubert Connell (CE); Bazine
 Carl Marcus Conrad (GS); Elk City
 Gertrude Vivian Conroy (HE); Manhattan
 Christine Carol Cool (HE); Plainville
 Victor Vincent Cool (GS); Plainville
 *George William Corbet jr. (Ag); Leona
 Hubert James Counsell (EE); Garden City
 Everett Russell Cowell (Ag); Clay Center
 Louise Lucile Cox (HE); Alton
 Lucile Louise Cox (HE); Alton
 Marvin Howard Crawford (Ag);
 California, Mo.
 Anna Marie Elizabeth Crocker (HE);
 Matfield Green
 George Todd Crouse (FME); Wellington
 Rolland Miller Crow (EE); Kansas City
 Oscar Cullen (ME); Lebanon
 Anne Augusta Cutler (HE);
 Deerfield, Ill.
 Mary Frances Davis (GS); Bronson
 Dorsie Lawrence Deniston (Ag); Stafford
 Abbie Clair Dennen (HE); Manhattan
 Addison Curtiss Depuy (ME); Manhattan
 Alexey Euguenievich Dobrohotov (Ag);
 Viazniki, Russia
 Claire Ansel Downing (FME); Wichita
 Mary Edmona Dudley (HE); Lebanon
 Harold Chester Elder (AE); Mankato
 Richmond Knostman Elliott (EE);
 Manhattan
 Mildred Faye Emrick (GS);
 Omaha, Neb.
 John Harold Epperson (AE); Hutchinson
 Jessie Belle Evans (GS); Goodland
 Bly Ewalt (HE); Medicine Lodge
 Harold Ralph Facklam (EE); Enterprise
 James Pryor Fallis (GS); Wichita
 Arthur McFerren Fine (Ag); Quenemo
 Harry Miles Fleenor (Ag); Leocompton
 Elsie Gladys Flippo (HE); Abilene
 Hazel May Flower (HE); Junction City
 Conie Caroline Foote (HE); Downs
 Gladys Evelyn Ford (HE); Seneca
 Mary Abigail Furneaux (HE); Moran
 Clifford Gallagher (VM); Perth
 Oscar Deane Gardner (EE); Louisburg
 Walter David Gardner (Ag); Kansas City
 Henry Gilbert Gentry (Ag); Winfield
 William Hopper Getty (Ag); Downs
 Ernest Eugene Gilbert (Ar); Manhattan
 Mary Helen Gilbert (HE); Manhattan
 Ruth Harriet Gilles (HE); Kansas City
 Howard Lewis Gingery (VM);
 Pawnee City, Neb.
 Mable Celesta Ginter (HE); Manhattan
 Edward Green Girard (ME); Windom
 Dorothy Gleason (HE); Scott City
 Ruth Goodyear (HE); Wichita
 Fannie Harriet Gorton (HE); Manhattan
 Irene Florence Graham (HE); Manhattan
 Chester Eugene Graves (Ag); Wellsville
 Fred Foster Greeley (ME); Manhattan
 Hilborn Hall Groat (VM); Silver Lake
 Evan Lawrence Griffith (GS); Manhattan
 Harry Anton Gunness (GS); Junction City
 Bertha May Gwin (HE); Washington
 Fred Lynn Hall (EE); Alma
 Isabell Hamilton (HE); Hastings, Neb.
 Lloyd Lee Hamilton (IJ); Wichita
 Marguerite Frances Hammerly (GS);
 Manhattan
 Gilbert Virgil Harper (GS); Calista
 Claude B. Harris (Ag); Havensville
 Ruth Garfield Harrison (HE); Jewell City
 Lucile Clara Hartman (HE); Hutchinson
 Charles Marion Haughton (CE); Wichita
 Herbert Benjamin Headrick (ME);
 Winfield
 Vivien Heath (Ag); Peabody
 Amma Cammella Herren (GS); Manhattan
 Chester Albern Herrick (Ag); Manhattan
 Edith Lyle Hoag (HE); Ionia
 Frank Hoath (AE); Anthony
 Irene Frances Hoffhines (HE); Marquette
 Glenn Henry Hollister (CE); Manhattan
 Arlie Alfreda Honeywell (HE); Seneca
 William Harold Hoots (Ag); Winfield
 Nellie Marie Hord (HE); Colony
 Walter Rawlins Horlacher (Ag); Colby
 Clara Belle Howard (HE); Colby
 David Marion Howard (Ag); Coldwater
 Mable Amanda Howard (HE); Manhattan
 Charles Willard Howe (Ag); Garrison
 Oliver Howels (Ar); Rosedale
 Fred Harold Hull (Ag); Portis
 May Agnes Hunter (HE); Rock Creek
 Dan Leo Jantz (AE); Larned
 Jerry Dillard Jarmon (VM); Coffeyville
 Edward John Jelden (VM); Columbus, Neb.
 George Scott Jennings (Ag); Winfield
 Gertrude Lucy Jennings (HE); Cheney
 Carlos McKinley Johnston (Ag); Attica
 Glenn Jones (Ag); Chanute
 Henrietta Antoinette Jones (GS);
 Osawatimie
 King Lawrence Jones (Ag);
 Kansas City, Mo.

* In Automobile Mechanics Short Course, first semester.

UNDERGRADUATE STUDENTS—SOPHOMORES—*continued*

- Everett Barton Kain (Ag);
 Rocky Ford, Colo.
 Walter August Karlowski (IJ);
 Sylvan Grove
 Kurt Herman Kecker (Ag); Frederick
 Ray Edwin Kellogg (FME); Wichita
 Foley Kiang (Ag); Hangchow, China
 Harriette Louise Klaver (HE); Kingman
 Raymond Scott Knox (EE); Jetmore
 Esther Leah Kohler (HE); Eudora
 Carl Albert Kreth (Ag); Onaga
 Inez Lake (GS); Lake City
 Ralph Edward Lang (Ag); Sylvia
 Clara Irma Larson (HE); Tescott
 Walter Frank Law (IJ); Sheridan, Ark.
 Blanche Lea (IJ); Greensburg
 Edwin Carl Lee (EE); Louisburg
 Thomas William Lee (EE); Yates Center
 George Wesley Leeson (GS); Council Grove
 Ione Elizabeth Leith (IJ); Irving
 William Ernest Logan (VM);
 Cheyenne, Wyo.
 Lucile Ludvickson (GS); Severy
 Carroll Loipaid Lund (Ar); Protection
 Geta Lund (IJ); Manhattan
 Norman Dale Lund (AE); Protection
 Robert Henry Lush (Ag); Altamont
 Rollo Wade McCall (Ag); Brewster
 Winifred Owen McCarty (Ag); Ames
 Elmer David McCollom (Ag); Bogard, Mo.
 Dewey Zollie McCormick (Ag); Zeandale
 Wallace Love McGehee (Ag); Lockney, Tex.
 Harold Joseph McGinley (Ag); Rogers, Ark.
 Charles Clyde McPherson (EE); Iola
 Franz Joseph Maas (ME); Alta Vista
 Carl Marrs (EE); Bradford
 Roy Ervin Marrs (EE); Bradford
 Benjamin Franklin Martin, jr. (Ag);
 Enid, Okla.
 Florence Ethel Mather (HE); Manhattan
 Rex Arthur Maupin (Ag); St. Joseph, Mo.
 Marvel Mona Merillat (GS); Great Bend
 Herbert Victor Mering (GS); Great Bend
 Marguerite Helen Miller (HE); Salina
 Marshall Miller (EE); Manhattan
 William Cloud Mills (Ag); Lake City
 George Harold Molesworth (EE);
 Louisburg
 Halford Ernest Moody (Ag); Riley
 Charles Raymond Moors (GS); McPherson
 Leonard G. Morgan (VM); Manhattan
 Glenna Fay Morse (HE); La Crosse
 Charles Francis Morris (EE); Wichita
 Dorothy Moseley (HE); Alma
 Donald Joseph Mosshart (ME); Manhattan
 Jephtha Jerry Moxley (Ag); Osage City
 George Miles Munsell (CE); Leon
 Donald Dudley Murphy (Ag); Halstead
 Marianne Muse (HE); Manhattan
 Alice Helen Mustard (HE); Manchester
 Thomas Neely (Ag); Abilene
 Walter Neibarger (IJ); Valley Falls
 Arthur Edward Nelson (FME); Lindsborg
 Oliver Franklin Nelson (Ag); Manhattan
 Francis Joseph Nettleton (CE); Lenora
 Clell Ansel Newell (Ag); Matfield Green
 Harry Emery Newton (Ag); Winfield
 Raymond Clyde Nichols (Ag); Buffalo
 John Frederick Novak (ME); Ellsworth
 Gerda Pauline Olson (HE); Wichita
 Merton Louis Otto (Ag); Riley
 Exena Owens (HE); Russellville, Ark.
 Clementine Paddleford (IJ); Manhattan
 Ida Pearl Parkhurst (HE); Kinsley
 Ruby Lauretta Parkhurst (HE); Kinsley
 Lee Marvin Parrish (EE); Derby
 Thomas Gilbert Perry (VM); Wichita
 Lenwood Peter Jacob Plaum (Ag);
 Cripple Creek, Colo.
 Dorothy Potter (HE); Barnes
 Faye Marie Powell (HE); Iola
 Elva Mae Price (HE); Baileyville
 James Wendell Pryor (ME); Kansas City
 Clarence Benedict Quigley (Ag); Blaine
 Karl Quisenberry (Ag); Newton
 Edith Blanche Ralston (HE); Towanda
 Oliver Reed (Ag); Manhattan
 Florence Elizabeth Reiner (HE);
 Manhattan
 Louis Rudolph Ritter (Ag);
 Jonesboro, Ark.
 Gladys Irene Ritts (HE); Topeka
 Nelle Robinson (GS); Manhattan
 William Chain Robison (Ag); Towanda
 Kathryn Roderick (HE); Emporia
 Lydia Eugenia Rogers (GS);
 Goodwell, Okla.
 Ethel Caroline Roop (HE); Wakefield
 Gladys DeElla Ross (HE);
 Oklahoma City, Okla.
 Warren Earl Rothweiler (EE); Bison
 Florence Rowles (IJ); Wamego
 Dorothy Katharine Ryherd (GS);
 Horton
 Marion Elizabeth Sanders (HE);
 Leavenworth
 Joseph Newton Sawtell (Ag); Kansas City
 Bennie Schemonski (GS); Belleville
 Abraham Burton Schmidt (EE); Canton
 Irwin Benjamin Schroetter (Ag);
 Randolph
 Lee Ashton Scott (VM); Westphalia
 Myra Edna Scott (GS); Manhattan
 William Dennis Scully (ME); Belvue
 Marcia Anna Seeber (GS); Great Bend
 Carolyn May Seitz (HE); Billings, Okla.
 Ursula Susie Senn (HE); Lasita
 Clare Liggett Shellenberger (Ag);
 Manhattan
 Ulysses Leonard Shelton (ME);
 Cunningham
 Josephine Shoemaker (HE); Severy
 Helen Virginia Sloan (HE); Independence
 Caroline Elizabeth Sloop (IJ); Boyle
 Albert Edward Smith (Ag); Tribune
 Clara Mary Smith (HE); Mound City, Mo.
 Mary Henrietta Smith (HE); Manhattan
 Naoma Archer Smith (HE);
 Long Beach, Cal.
 Raymond Woodruff Smith (ME);
 Hiawatha
 Luella Margaret Snay (HE); Nortonville
 Nathaniel Sheridan Spangler (Ag); Abilene
 Fletcher Speck (Ag); Kansas City
 Bernice Myrle Spence (HE); Hanover
 Prudence Stanley (HE); Topeka
 Jay Ralph Starkey (VM); Manhattan
 Oscar Steanson (Ag); Oklahoma City, Ok.
 Everett Stearns (EE); Towanda
 Mildred Sterling (HE); Clay Center
 William Thomas Sterling (Ag); Herington
 Elma Ruth Stewart (HE); Topeka
 Lillian Colene Stewart (HE);
 Hamilton, Mo.
 Velda Elizabeth Steward (HE);
 Morganville
 Lawrence Edward Stonge (EE); Riley
 Mabel Mangelhild Swanson (HE);
 Manhattan
 Harry Jay Swarm (CE); Norton
 Mitchell Tessorndorf (EE); Onaga
 Joseph Eugene Thackrey (GS);
 Valentine, Neb.
 Charles Albert Thresher (Ag); Jetmore
 Ruby A. Thomas (HE); Argonia
 John Titus (AE); Harper
 Charlotte Irene Toliver (HE); Abilene
 Everett Leon Tullis (EE); Olathe

List of Students

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UNDERGRADUATE STUDENTS—SOPHOMORES—*continued*

<p>Everett Tunnichiff (VM); Rawlings, Wyo. Grace Leota Turner (GS); Milton Louise Clark Unthank (HE); Kansas City Bryce Leroy Vandruff (VM); Holbrook, Neb. Ethel Grace VanGilder (HE); Manhattan Loren Gilbert Van Zile (VM); Manhattan Perttu Hannes Virtanen (Ag); Butte, Mont. Mattie Washburn (HE); Spivey Millard Cummings Watkins (EE); Clay Center Hazel Mary Watson (HE); Mount Hope Ray Bates Watson (Ag); Wichita Galdys Weaver (HE); Beattie Arthur Weber (Ag); Horton Norine Ardeth Weddle (GS); Lindsborg Sara Esther Weide (HE); Yates Center Frances Craig Westcott (Ar); Galena</p>	<p>Jennings Elliott Williams (VM); Windsor, Mo. Marion Manning Williams (VM); Muscotah Ruth Evalyn Willis (HE); Manhattan John Cathcart Wilson (GS); Manhattan Thomas Wakeman Wiltrout (EE); Logan Lee Winter (GS); Lecompton Warren Mudgette Woodman (Ag); Vermillion ‡Nathaniel Preston Woods (EE); Ellsworth Gladys Thelma Woodard (HE); Kansas City, Mo. Esther Wright (GS); Welsh, Louisiana Clemens Harry Young (Ag); Manhattan Clarence Le Roy Zimmerman (EE); Olathe Lloyd Zimmerman (EE); Lockney, Tex.</p>
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FRESHMEN

<p>Edith Dorothy Abbott (IJ); Manhattan May Maria Abbott (GS); Manhattan Roger Leon Abbott (CE); Garden City Donald Adair Adell (Ag); Topeka Charles Asa Akers (Ag); Conway John Akers (Ag); Conway James Henry Albright (Ag); Winfield Dale Allen (ME); Burlington Jesse Levi Allen (Ag); Norwich Fern Catharine Allison (GS); Kinsley Howard Albert Ames (CE); Downs Esther Ruth Amundson (HE); Bottineau, N. Dak. °Casper McKinley Anderson (EE); Neosho Falls Harold Edmond Anderson (ME); Atwood Henry Anderson (Ag); Neosho Falls Paul McKee Anthony (EE); Westmoreland Raymond Armantrout (Ag); Friend Joseph Glen Astle (Ag); Haven Dennis Franklin Atkisson (Ag); Uniontown Oneta Mae AuMiller (HE); Abilene Aldis Lynn Austin (Ag); Irving Florence Adelaide Austin (HE); Eldorado Oscar Hugh Aydelotte (EE); Manhattan Lillian Edna Ayers (GS); La Harpe Vida Mildred Ayers (HE); Sabetha Mamie Evelyn Bachura (HE); Wilson Gottlob John Baessler (ME); Coldwater Edgar Francis Bailey (EE); Pratt Glenn Bernard Bailey (EE); Pratt Kenneth Albert Baird (ME); Formoso Floyd Winfield Baker (Ag); Republic Harold Theodore Baker (EE); Tonganoxie Orville Movetta Baker (CE); Parsons Charles Francis Bales (EE); Lebanon Ernest Edward Ball (ME); Deerfield Ralph Ewing Ballantyne (EE); Norton Donald David Ballou (IJ); Delphos Marion Henry Banks (ME); Wichita Robert Eli Barge (EE); Hoisington Justus Wheeler Barger (Ag); Newkirk, Okla. Virgil Elias Barger (EE); Smith Center Helen Mildred Barnett (HE); Denison Murlin Clyde Barrows (EE); Clifton Jesse Millard Baxter (EE); Kinsley James Omar Beal (AE); Norwich Rolly Loyd Beaman (EE); Leon Arthur Frederick Becker (EE); Ellsworth Jonathan Becker (EE); Russell</p>	<p>Claude Oran Beckett (ME); Eldorado Hazel Reba Beeks (HE); Genda Springs Chester Raymond Beeson (EE); Concordia William Newton Beezley (GS); Kinsley Joseph Bellomy (Ag); Manhattan Edgar Clarence Bender (ME); Topeka *Charles Cole Benedict (Ag); Bennington Emmett Delbert Benham (ME); Enterprise Marjorie Marie Berger (GS); Sylvan Grove Jasper Clark Berry (GS); Norwich Robert Russell Bethel (ME); Concordia Perry Betz (Ag); Asherville Andrew William Beverly (ME); Concordia Joseph Ersal Beyer (CE); Mooreland, Okla. Ivaloo Elizabeth Bickel (HE); Barnes Mary Frances Bird (HE); Great Bend Victor Raymond Blackledge (GS); Onaga Millard Thomas Bland (GS); Smith Center Paul Linn Blankinship (Ag); Anthony Donald Earl Blocksome (GS); Ransom Marguerite Mildred Bondurant (HE); Ness City Harold Booth (ME); Sterling Eugene Watson Borah (ME); Grinnell John Barnett Bowen (EE); Osborne John Raymond Bowers (EE); Downs William John Boys (CE); Wichita Cecil Uel Bradley (EE); Greensburg Walter Raymond Bradley (EE); Kidder, Mo. Chester Leon Bradshaw (EE); Altoona Foster Otis Bragg (ME); Liberal Frank Salisbury Breed (AE); Emporia Palmer Fair Bressler (Ag); Manhattan Albert Lorraine Bridenstine (EE); Marienthal Lawrence William Bright (EE); Wichita Marian Elizabeth Brookover (HE); Eureka Awilda Brown (HE); Winfield Earl Holmes Brown (GS); Windom George Wesley Brown (ME); Leon Henry Lane Brown (CE); Blue Rapids Leslie James Brown (Ag); Mulvane Raymond Price Brown (ME); Manhattan Stanley Hugh Brown (ME); Clay Center Dollie Edythe Browning (IJ); Manhattan Charles Abraham Brubaker (Ag); Harper Orville Kenneth Brubaker (EE); McPherson</p>
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° Deceased.

* In Farmers' Short Course, second semester.

‡ In Automobile Mechanics Short Course, first semester.

UNDERGRADUATE STUDENTS—FRESHMEN—*continued*

- Neal Dwight Bruce (Ar); Marquette
 Michael Joseph Brull (EE); Everest
 Julius Camenius Bruner (ME); Concordia
 Homer Griffin Bryson (Ag); Leon
 Guy Emerson Buck (EE); Salina
 John William Bucklee (EE); Manhattan
 Robert Lee Bumgardner (CE);
 Arkansas City
 Leslie Burger (HE); Seneca
 William Harold Burgwin (CE); Eldorado
 Bertha Anna Burk (HE); Clifton
 Earl Frederick Burk (Ag); Ottawa
 Carl Eldin Burke (ME); Solomon
 Harley Kercher Burns (ME); Liberal
 Harvey LeRoy Burns (IJ); Labette
 Elvira Josephine Bussey (HE); Muscotah
 Oliver Pardee Butler (Ag); Farmington
 Carroll Button (GS); Elmont
 Leo Edwin Button (ME); Great Bend
 Lawrence Byers (Ar); Abilene
 Robert Lancaster Byrnes (EE); St. Marys
 Ira O Call (CE); Downs
 Myrtle Louise Camp (HE); Manhattan
 † Henry Mason Carleton (ME); Cawker City
 * Alfred James Carlson (Ag); Irving
 Arthur John Carlson (ME); Manhattan
 Waldon Noble Carlson (Ar); Randolph
 George Anson Carroll (EE); Garden City
 Frank Raymond Carson (ME); Hamilton
 Victor Guy Carter (AE); Hiawatha
 Asa Andrus Castle (Ag); Clayton
 Frances Casto (GS); Guymon, Okla.
 Hortense Caton (HE); Winfield
 John Walton Caughey (GS); Manhattan
 Laurence Jackson Cavenah (Ag); Harper
 Francis Eugene Charles (Ag); Republic
 Volney Allen Chase (Ar); Manhattan
 George Fabrique Christman (ME);
 Wichita
 Bert Edward Church (CE); Haddam
 Kay Iverson Church (ME); Haddam
 Francis Marion Clark (EE); Wichita
 Leo Melvin Clark (Ar); Chapman
 Nita Rose Clark (HE); Wichita
 Orpha Lodeen Clark (HE); Hutchinson
 Roy Engle Clegg (Ag); Altoona
 William Cline (EE); Shaw
 Claran Clifton Cobb (ME); Waynoka, Okla.
 Fred Cocherell (EE); Manhattan
 Mary Lorene Coffman (GS); Overbrook
 Floyd Francis Cole (VM); Ellis
 Bernard Albert Coleman (GS); St. Marys
 John Allen Collins (EE); Larned
 Ralph Edwin Colton (EE); Westphalia
 Harold Bullet Combs (Ag); Winfield
 Velma Bertha Conner (HE); Blue Mound
 Irene Margaret Conroy (HE); Manhattan
 Helen Lucille Cooper (HE); Clearwater
 McCullough Cooper (CE); Alta Vista
 Frank Raymond Cooper (EE); Clearwater
 Milton Irvin Cooper (EE); Hoxie
 † Walter Cooper (ME); Beardsley
 David Kennilworth Copeland (Ag);
 Beatrice, Neb.
 Samuel Lynn Copeland (Ag); Hutchinson
 Charles Edward Cordts (Ag); Overbrook
 John William Cordts (GS); Overbrook
 Franklin Holmes Correll (AE);
 Little River
 T. J. Cory (ME); Talmo
 Warren Cowell (Ag); Clay Center
 Otis DeWitte Cox (EE); Sedgwick
 Ray Franklin Craige (EE); Colby
 Paul Dellno Crangle (GS); Mankato
 Georgia Belle Cuihfield (HE); Geneseo
 Hubert Rollin Croddy (GS); Circleville
 James Arthur Crow (Ag); Harper
 Joshua Harrison Crowder (Ag); Altoona
 Reba Collum (HE); Manhattan
 John Daniel Cunningham (GS); Manhattan
 Ruth Lois Cunningham (HE); Manhattan
 Vincent Benedict Cushing (Ag); Chapman
 Ruth Margaret Dalton (HE); Frankfort
 Hollis Omer DaMetz (ME); Gaylord
 George Stuart Davis (EE); Clay Center
 George Wilbur Davis (EE); Leon
 Chester Elmer Davison (EE); Greensburg
 Roger Owen Day (CE); Glasco
 Floyd Archie Decker (EE); Troy
 Mylber Leslie Decker (ME); Eureka
 George William Dehm (Ag); Topeka
 Elmer Frank Deshaser (CE); Merriam
 Carl Curt Dethloff (Ag); Kansas City, Mo.
 ‡ Orla Joseph DeWater (ME); Hutchinson
 Mabel Sophia Dial (HE); Fall River
 Lloyd Lathirl Diamond (GS); Anthony
 Elizabeth Dickens (IJ); Manhattan
 Roy Doane (EE); Osborne (Deceased)
 Maurice Erle Dodd (EE); Langdon
 Stanley Dewey Doggett (CE); Howard
 Earl Ralph Domoney (EE); Downs
 Alberta Douglass (HE); Lyons
 William Edmund Douglass (EE);
 Garden City
 Irene Dora Drake (HE); Wichita
 William Jergon Henry Dressel (EE); Lyons
 Linza Allen Drum (CE); Ottawa
 Margaret Dubbs (HE); Ransom
 Leah Belle Duff (HE); Horton
 Lester Arthur Dumond (GS); Garden City
 Gerald Stone Durlinger (ME); Burrton
 Edwin Lorin Early (EE); Norwich
 Wilburn Rogers Easton (Ag); Winchester
 Charles Sylvester Ebenstein (EE);
 Manhattan
 Luther Merton Eddy (EE); Havensville
 J. C. Starr Edwards (EE); Walnut
 Roy William Eib (ME); Clay Center
 Milton Stover Eisenhower (IJ); Abilene
 Eleanor Dryden Encell (HE); Howard
 Merritt Austin English (GS); Hutchinson
 Arnold Joseph Englund (Ag); Falun
 Victor John Englund (CE); Falun
 Elmer Rowland Enns (EE); Inman
 Margaret Elizabeth Epperson (HE);
 Hutchinson
 Ruth May Eppler (HE); Ellis
 Lester Edgar Erwin (Ag); Willis
 Clara Bernice Evans (HE); Liberal
 Henry Marks Evans (ME); Sedgwick
 John Evans (Ag); Osage City
 Marlin Evans (ME); Rossville
 Moses Orben Eversoll (GS); Agra
 Tallof Christopher Everson (GS); Mankato
 Charles William Ewing (CE); Olathe
 George Fagerstrom (GS); Salina
 George Holcombe Fairchild (Ag); Hiawatha
 Joseph Fairhurst (Ag); Winchester
 Arline Jessie Faley (HE); Manhattan
 Kenneth Clyde Farley (VM);
 Natchitoches, La.
 Claude Nathan Farrant (ME); Frankfort
 George Oswald Faulkner (EE); Belleville
 Frank Leonard Fellingham (ME); Peabody
 Glen Walter Fenton (ME); Burlingame
 Glenn George Ficken (GS); Burrton
 George Albert Filingner (ME); Cuba
 Glenn Erving Findley (Ag); Manhattan

* In Farmers' Short Course, second semester.

† In Machinists' Short Course, second semester.

‡ In Tractor Operator Short Course, second semester.

UNDERGRADUATE STUDENTS—FRESHMEN—*continued*

- Frank Everett Fine (EE); Quenemo
 Charles Louis Fink (CE); Beattie
 Hardin Guy Fink (Ag); Manhattan
 Clarence Elmer Fischer (GS); Kansas City
 Marjorie Fisher (GS); Manhattan
 Ralph Emonrel Fisher (GS); Norton
 Edward Francis Fitzgerald (ME); Colby
 Clifton Reginald Fleming (GS);
 White Water
 Gertrude Evelyn Flowers (HE);
 Hastings, Neb.
 Paul Alfred Foltz (EE); Waco, Tex.
 Asa Herbert Ford (EE); Seneca
 Jess John Ford (Ag); Manhattan
 Charles Arthur Foster (ME); Achilles
 William Abe Fox (ME); Larned
 Karl Frank (EE); Manhattan
 Ella Amy Franz (HE); Rozel
 Ethel Mary Freeland (GS); Horton
 Herbert Sawyer French (ME);
 Corpus Christi, Tex.
 †Clyde Dow Frost (GS); Blue Rapids
 Paul John Fulcomer (GS); Belleville
 Robert Russell Fuller (EE); Protection
 Elsie Fulton (HE); Eldorado
 *Harold Myron Fuqua (Ag); Lyons
 Guy Clyde Gamble (FME); Chanute
 Elton Milbert Gard (Ag); Stafford
 Frederick Augustus Gardner (ME);
 Louisburg
 Grace Lillian Gardner (HE); Hutchinson
 Clifford Earl Garinger (ME); Salina
 Gerald Lynn Garloch (EE); Garden City
 Robert Franklin Garrett (EE); Clifton
 Roy Preston Garrett (GS); Manhattan
 Ruth Reynolds Garvin (HE); Lawrence
 Glen Earnest Gates (CE); Kansas City
 John Gattermeier (FME); Olean, Mo.
 Samuel Peter Gatz (GS); McPherson
 William Ezekiel Gault (CE); Wichita
 Floyd Omar Gerken (VM); Ellis
 Doyle Kenneth Gilbert (Ag); Osborne
 Samuel James Gilbert (Ag); Arkansas City
 Jesse Curtis Gillette (IJ); Wichita
 Robert Kenneth Girard (GS); Windom
 George McGrew Glendening (EE);
 Circleville
 Evelyn Marie Glenn (HE); Medford, Okla.
 William Glenn, jr. (Ag); Manhattan
 John Calvin Goheen (ME); Clay Center
 Mattie Lena Goodin (GS); Clay Center
 Orion Ellsworth Gooding (Ag); Girard
 Arthur Ernest Goodwin (EE); Concordia
 Marion Abraham Graham (GS); Manhattan
 Arthur Asher Graves (Ar); Manhattan
 Earl Francis Graves (Ag); Manhattan
 Hazel Louise Graves (HE); Manhattan
 Roy Clyde Gray (GS); Bartlesville, Okla.
 Allen Edward Green (Ag); Eureka
 Everett Ray Green (EE); Le Roy
 Earl Webster Green (VM); White Cloud
 Theodore Reed Griest (Ar); Topeka
 Grace Mabel Griffiths (HE); Baileyville
 Raymond Gross (GS); Salina
 Garnet Vivean Grover (HE); Iola
 Edith Gay Grundmeier (HE); Barnard.
 Joseph Edward Haag (EE); Holton
 Hester Hackney (HE); La Harpe
 Frances Wilma Haegert (HE); Randall
 Belle Hagans (GS); Manhattan
 Charles Hagberg (CE); Clay Center
 Arthur Samuel Haggard (Ag); Oswego
 Ray Dryer Hahn (CE); Clay Center
 Clarence Vernon Hale (ME);
 Beatrice, Neb.
 Lawrence Hall (ME); Manhattan
 Helen Halsey (HE); Independence
 Mildred Josephine Halstead (HE);
 Manhattan
 Harold Albert Hammond (IJ); Manhattan
 Earl Emanuel Hampshire (EE); Garnett
 Harold Burret Hanks (GS); Sterling
 Walter Roy Harder (Ag); Minneapolis
 Miriam Ellen Harling (Ar); Manhattan
 *Jack Harner (Ag); Green
 John Justin Harper (ME); Frankfort
 James William Harris (EE); Leon
 George Lee Harte (ME); Cunningham
 Glenn Harter (ME); Courtland
 Jane Gladys Hartley (GS); Manhattan
 Allen Paul Hartman (CE); Frankfort
 Clarence Albert Haser (Ag); Circleville
 Casper William Hassebrook (ME); Riley
 Clarence Raymond Hatfield (CE); Wichita
 Claire Lebert Hawkins (GS); Tampa
 John Clark Haynes (ME); Perry
 Grace Hendrick (HE); Winfield
 Elizabeth Heath (HE); Peabody
 John Lee Heaton (CE); Liberal
 Joseph Julius Hedrick (CE); Olathe
 Loren Bryce Hedding (ME); Burrton
 Clyde Harvey Hegle (Ag); Lost Springs
 Norman Wolf Heim (GS); Ellinwood
 Joseph Hendrix (CE); Lane
 †Edward Andy Henke (ME); Beloit
 †Fred John Hennes (EE); Burns
 °Bernice Ruth Hering (HE); Stafford
 Perry Joseph Hershey (EE); Whitewater
 Arthur Gerald Hessel (ME); Frankfort
 George John Higgins (ME); Solomon
 Harry Lee Higgins (ME); Neodesha
 Jack Hill (Ag); Leocompton
 Durland Hilts (GS); Anthony
 †Forest Reed Hines (EE); Burns
 Asabel Delma Hinshaw (CE);
 Clay Center
 Marion Francis Hitchcock (CE);
 Hutchinson
 Lewis Thomas Hixon (Ag); Clayton
 Ernest Eugene Hodgson (Ag); Harveyville
 Emil Hokanson (CE); Marquette
 Floyd Richard Holcomb (EE); Canton
 Bailey Orlando Holland (GS);
 Hot Springs, Arkansas
 †Ellen Hedvick Holverson (HE); St. Marys
 Lottie Aileen Hoover (HE); Winfield
 Richard Hopper (ME); Manhattan
 Millard Jennings Horne (Ag); Alma
 Robert Horsfield (GS); Topeka
 Kenneth Oscar Houser (EE); Wichita
 Glenn Anson Houston (GS); Gem
 Agnes Howard (HE); Winona
 Angie Howard (HE); Colby
 Harvey Earle Howard (Ar); Manhattan
 Charles Harold Howe (GS); Chapman
 Francis Joseph Howe (GS); Chapman
 Earl James Howell (Ar); Morganville
 Harry Newman Hudson (Ag); Topeka
 Guy Raymond Huey (CE); Louisville
 Walter Henry Hukreide (CE); Clebourne

* In Farmers' Short Course, second semester.

† In Tractor Operator Short course, second semester.

‡ In Automobile Mechanics Short Course, second semester.

° Deceased.

|| In Electricians' Short Course, second semester.

¶ In Housekeepers' Course, second semester.

UNDERGRADUATE STUDENTS—FRESHMEN—*continued*

- Homer Harry Humphrey (AE); Denison
 Mae Amelia Humphrey (HE); Denison
 Harvey Bryan Hunt (CE); Harper
 Curtis Stanley Hunter (GS); Rock Creek
 George Dewey Huston (Ar); Manhattan
 John Browning Hylton (GS); Manhattan
 Donald Bryan Ibach (Ag); Arkansas City
 Merton Elliott Irvin (GS); Coffeyville
 Charles Frank Irwin (GS); Le Roy
 Mattie Christine Jackson (HE);
 Kansas City
 Gard Thomas James (Ag); Lane
 Guy Herndon James (CE); Eldorado
 Paul Henry Jeffcoat (GS); Abilene
 Paul Ronald Jenkins (ME); Salina
 Ralph St. Clair Jennings (EE); Le Roy
 Ralph Walter Jensen (EE); Norton
 Roger Reed John (ME); Shaw
 Florence Marguerite Johnson (GS);
 Manhattan
 Harold William Johnson (Ag); Cleburne
 Dewey Funston Johnston (ME);
 Concordia
 Harry Marcus Johnston (ME); Concordia
 Tracy Ebbert Johnitz (ME); Abilene
 Alvin Joy Jolley (Ag); Manhattan
 John Cyrus Jones (FME); Topeka
 John Paul Jones (ME); Wakita, Okla.
 William Harold Jones (CE); Burden
 Marian Jordon (HE); Manhattan
 Harlan Kapka (ME); Kansas City
 Omer Karns (CE); Fort Scott
 Glen Nelson Karstadt (Ag); Bennington
 Dwight Moody Keas (EE); Princeton
 Dewitt Russell Kelley (CE); Cuba
 Victor Harold Kelley (EE); Penaloza
 Ira David Sankey Kelly (CE); Salina
 Bernard Smithman Kendall (AE);
 Smith Center
 Clarice Mildred Kendall (HE); Ottawa
 Francis Gerald Kennedy (EE); Norton
 Mabel Rose Kennedy (HE); Stockdale
 William Ray Kenoyer (GS); Hutchinson
 Harleigh Bernard Kensinger (EE);
 Walnut
 Kenneth Key (CE); Wichita
 John James Kiley (Ag); Chase
 Arthur Glenn Kincaid (Ag); Wathena
 Roy Clifford Kingsley (GS); Inman
 Vesta Eulela Kinyon (HE); Manhattan
 Fred Henry Kircher (CE);
 Pleasant Hill, Mo.
 Grace Lilas Kirk (HE); Manhattan
 Robert Wylie Kirkpatrick (Ag); Webber
 Cecil Earl Kirkwood (GS); Spearville
 Ben Thomas Kitterman (ME); Toronto
 Louis Myers Knight (Ag); Medicine Lodge
 Kathleen Knittle (GS); Manhattan
 Carol Knostman (HE); Wamego
 Bernard Adolph Koch (GS); Fredonia
 William Harold Koenig (Ar); Nortonville
 Martin Enloe Konold (GS); Toronto
 Iva Mayra Kopp (HE); Hiawatha
 Paul Kovar (EE); Kansas City, Mo.
 Emmett Engle Kraybill (Ar); Abilene
 Frank Marion Kufus (Ag); South Haven
 Frederic Wilson Kuhnle (GS); Clyde
 Harold Kyle (GS); La Crosse
 Harold Neff Lamme (EE); Whiting
 Agnes Theresa Laptad (HE); Lawrence
 Lela Dorothy Larkin (GS); Manhattan
 Frank Lerner (CE); Oskaloosa
 Harold Ellison Laughlin (ME);
 Wakita, Okla.
 Cecil Pruitt Lawrence (GS); Harper
 William Floyd Laws (GS); Norton
 Harold Amos Layton (GS); Osborne
 Lysie Douglas Leach (Ag); Winfield
 Elden Emanuel Leasure (ME); Solomon
 Vera Louise Lee (HE); Glen Elder
 Erma Elizabeth Lefringhouse (HE);
 Colby
 Martin Frederic Robert Lehman (ME);
 Nortonville
 LeRoy Markle Leiter (CE); Protection
 Eva Bell Leland (HE); Wichita
 Louie Smith Lemert (ME); Liberal
 Lloyd Albert Lentz (Ag); Whiting
 Dale Baker Levi (CE); Olathe
 William Jacob Leydig (GS); Glade
 Ira William Lewis (GS); Downs
 Dewey Lilley (Ag); Olivet
 William David Lobaugh (Ag); Greenleaf
 Madaline Maxine Locke (GS); Erie
 Victor Joseph Lofgren (EE); Norton
 Charles Dewey Logan (EE); Onaga
 Glen McCrea Longley (CE); Lebanon
 Harvey Franklin Lorrance (EE); Argonia
 Leland Phillips Lovejoy (CE); Clay Center
 Raymond Russell Luce (ME); Anthony
 Daniel Gail Lynch (ME); Manhattan
 Carl George McCaslin (GS); Eureka
 Henrietta Vera McClelland (HE);
 Manhattan
 Charles Freeman McCreight (AE); Wilsey
 Helen Ball McDonald (HE);
 Kansas City, Mo.
 Robert Daniel McDonald (CE); Atwood
 James Lee McEwen (Ag); Louisville
 Frank McFadden (Ag); Stafford
 Wade Melvin McFarland (Ag); Chase
 Warren Curtis McFarland (Ag); Chase
 James Alfred McKinley (EE); Colby
 Howard Roswell McInteer (EE); Minneola
 Harold Theodore McKeever (Ag);
 Circleville
 Ralph Gilmore McKinney (ME);
 Great Bend
 James Alexander McKitterick (VM);
 Greenwood, Mo.
 Paul Marquois McKown (EE); Manhattan
 Pearl Marina McKown (HE); Manhattan
 Kenneth Jay McLaughlin (EE); Toronto
 Raoul Ihri McLaughlin (ME); Toronto
 Katherine Cardwell McQuillan (HE);
 Clifton
 Ina Mary McVey (HE); Hill City
 Joseph Taylor Mackey (AE);
 Kansas City, Mo.
 Hugh Francis Maguire (GS); Topeka
 Robert Jeremiah Mahoney (Ag);
 Bunker Hill
 Allen David Majors (ME); Russell Springs
 Ross James Maltby (Ar); Salina
 Paul Christoph Mangelsdorf (Ag); Atchison
 Ray Eugene Marshall (Ag); Manhattan
 Dewey Albert Martin (CE);
 Bartlesville, Okla.
 Harvey Addison Martin (GS);
 Junction City
 Sarah Margaret Mason (GS); Belle Plaine
 Hilery Edwin Mather (Ag); Manhattan
 Rolland Sylvester Mather (Ag); Manhattan
 Clifford Matter (ME); Jewell
 Orpha Maust (GS); Garden City
 Gladys Edna May (HE); Kansas City, Mo.
 Hobart Irwin May (ME); Manhattan
 John Harold May (CE); Lebanon
 Albert Vincent Mead (IJ); Manhattan
 Earl Thomas Means (Ag); Everest
 Dorris LuVerne Mell (HE); Wetmore
 John Francis Melroy (GS); Norton
 Joseph Leo Melroy (EE); Norton
 Grace Merillat (GS); Enterprise
 Arthur Leroy Meserve (Ag); Ellis
 Dorothy Frances Messenger (HE); Basil

° Deceased.

UNDERGRADUATE STUDENTS—FRESHMEN—*continued*

- Virginia Malinda Messenger (HE); Basil
William Wesley Mettler (CE); Atwood
Roy Lee Meyer (Ag); Anthony
Walter Lee Meyer (VM); Riley
John Lawton Miles (EE); Altamont
Earle Ellsworth Miller (Ag); North Topeka
Jessie Enola Miller (IJ); Belleville
Fred Miller (Ag); Wamego
Clifford Carlyle Milner (Ag); Clayton
Alice Brady Mitchell (IJ);
Kansas City, Mo.
Ray Mitchell (Ag); Nettleton, Mo.
Olivette Viola Mitsch (HE); Woodbine
Georgia Mae Moffitt (GS); Manhattan
Charles Hungerford Monroe (Ag);
Cawker City
Alice Cora Montgomery (GS); Greenleaf
* Homer Thomas Moody (Ag); Mankato
Cecil Moore (ME); Manhattan
George DeVore Morris (ME); Manhattan
Leonard Benjamin Morris (Ag); Paxico
Luella Lucille Morris (HE); Wichita
Noble Brewer Morrison (ME); Coffeyville
Houston Browning Mount (ME);
Ada, Okla.
Frank Banner Muedener (EE); Lyons
Edmond John Mueller (EE); Washington
Guy Archibald Murray (CE); Nekoma
Ralph Myers Murray (EE); Protection
Lester Orloff Myers (ME); Windom
Harold Smith Nay (ME); Manhattan
Aria French Neal (HE); Clay Center
Earl James Neal (Ag); Anthony
George Oliver Neal (GS); White Water
Paul Elden Neil (ME); Solomon
Isabel Neitzel (HE); Concordia
Jessie Adelaide Newcomb (HE); Garnett
Fred Nichols (Ag); Nortonville
Lucian Wilben Nichols (GS); Spearville
Wesley Nonken (EE); Peabody
Wayne Vivian Nordstrom (EE);
Clay Center
Minnie Olivia Norlin (HE); McCracken
Dorothy North (HE); Winfield
Charles William Norton (CE); Grainfield
§ Thomas Arel Olliff (CE); Lebanon
Maurice Allen O'Neil (CE); Wellsville
Joseph Benjamin Oppiger (Ag); Ransom
Harry Raymond Orchard (EE);
Sidney Randle Osborn (CE); Frankfort
Harold Stewart Ott (GS); Olathe
Glenn Alfred Page (ME); Rossville
Grace Alberta Paize (HE); Manhattan
Joseph Parker (ME); Atwood
James Ora Parr (Ag); Rossville
Leo James Parsons (ME); Junction City
Richard Henry Passman (EE); St. Marys
Loyal Francis Patten (ME); Liberal
Joseph Walker Patterson (ME); Spivey
Fred Harold Paulsen (Ag); Stafford
Ralph Clinton Payne (GS); Hutchinson
Cecil Ashley Paynter (GS); Webber
Ruth Jane Peck (GS); Berryton
Parks Brinkley Pedrick (Ag);
New Orleans, La.
Alfred Tennyson Penner (EE);
White Water
Levi Charles Perrussel (ME); Onaga
Florence Ute Persons (GS); Manhattan
Gladys Irene Peterson (IJ); Hutchinson
Lars Peterson (Ag); Parker
Maude Pfenniger (HE); Rozel
Paul John Phillips (EE); Paola
Phil Delbert Piatt (Ag); Hamilton
Robert Bryden Piatt (Ag); Hamilton
Alva Daniell Pipkin (CE); Cheney
Donald Louis Plagman (GS); Winfield
Eva Mildred Platt (HE); Manhattan
George McClelland Pope (Ag); Udall
Helen Porter (HE); Wichita
Jay Pounds (EE); Coldwater
Charles Wallace Pratt (CE); Wiggins, Mo.
John David Pratt (EE); Colby
† Ernest Max Prickett (ME); Wamego
Hally Ralph Priestley (EE); Mutual, Okla.
Virgil Dale Proctor (EE); Norton
Elsie Inez Puckey (HE); Clay Center
Harry Donald Pugh (Ag); Topeka
Rayburn John Purves (EE);
Morganville
James Benjamin Quinlan, jr. (GS);
Manhattan
Jean Merrill Ragle (GS); Coffeyville
Doris Myrtle Ralston (GS); Lincoln
Horace Malvern Randels (Ag); Anthony
‡ Olma Monroe Rath (EE); Neodesha
Floyd Ratts (VM); Atlanta
Earl Herbert Raymond (GS); Towanda
George Harvey Reazin (EE); Manhattan
Charles Henry Reep (GS); Abilene
Decatur King Rees (GS); Solomon
R. B. Reeves (ME); Atwood
George Samuel Reinhart (EE); Chanute
Harold William Retter (ME);
North Topeka
John Edward Rexroad (ME); Darlow
Hattie Elizabeth Reynolds (HE);
Kansas City
Carl Ernest Richardson (EE); Barclay
Ralph Burton Ricklefs (EE); Troy
Ralph Thomas Ricord (Ag); Esbon
John Calvin Riddell (EE); Salina
Mildred Mueller Rittenoure (GS);
Wichita
Harry Neal Robbins (ME); Wichita
Carson Basil Roberts (Ag); Webb City
Denton Oliver Roberts (Ag); Stafford
Richard Hugh Roberts (GS); Burrton
|| Clyde Merle Rogers (EE); Burlingame
Richady Jay Rogers (CE); Louisburg
Ruth Helma Rogers (HE); Concordia
Walter John Rogers (FME); Salina
John William Rogge (ME); Russell Springs
Walter Thomas Rolfe (Ar); Wetmore
Hester Ross (HE); Manhattan
Lee Rossel (EE); Meade
Jesse Oliver Rothrock (EE); Salina
Glenn Lyonel Rucker (GS); Burdett
Cecil Byram Rugles (EE); Mankato
|| Bessie Marguerite Russell (HE); Muscotah
Fred Farsythe Russell (Ag); Paola
Ralph William Russell (VM); Mankato
* John Harvy Rust (EE); Washington
Mildred Minnie Rust (HE); Washington
Morse Henderson Salisbury (GS); Eldorado
William Sartorius (ME); Garden City
Herman Albert Schaben (EE); Bazine
Roy Schesser (GS); Prairie View
Eben Ellsworth Scholer (CE); Milo
William Lester Schroeder (ME); Albert

* In Farmers' Short Course, second semester.

† In Tractor Operator Short Course, second semester.

‡ In Auto Mechanics Short Course, second semester.

§ In Blacksmiths' Short Course, second semester.

|| In Machinists' Short Course, second semester.

¶ In Housekeepers' Course, second semester.

UNDERGRADUATE STUDENTS—FRESHMEN—*continued*

- Leonard Reniegus Schroth (EE); Chase
Lawrence Nicholas Schumaker (GS); Clifton
Dale Schwartz (Ag); Winkler
Charles Erwin Scott (ME); Westmoreland
Edward James Scott (VM); Kansas City
Gladys Annette Scott (HE); Topeka
Kenneth Jeffrey Scott (Ag); Westmoreland
Madge Marian Scott (HE); Kansas City
Victor Winfield Scott (IJ); Wichita
Richard Maurice Sears (Ag); Eureka
Don Seaton (Ag); Waterville
Paul Robert Seematter (ME); Frankfort
Irene Cordelia Seery (HE); Topeka
Carl John Seitz (ME); Wichita
Lester Ralph Sellers (ME); Great Bend
Robert Edwin Shafer (Ag); Norwich
Roland George Shafer (EE); Milo
Roland Belle Shane (Ag); Harper
Glynn Harrison Shaw (Ag); Oberlin
William Harold Shinkle (EE); Mound City
James Morton Shively (Ag); Minneola
Homer Shreve (EE); Wichita
Ralph Edward Shuart (ME); Hutchinson
Covert Preston Shuler (Ag); Beeler
Russell Franklin Sidles (IJ); Wichita
Verne Franklin Simons (CE); Howard
Ralph Edgar Simonson (VM); Danbury, Neb.
Samuel Arnold Simpson (GS); Salina
Leland Otis Sinderson (EE); Manhattan
Earle Bernice Slason (EE); Stockton
Charles Everet Smart (ME); Manhattan
Adolphine Grant Smith (CE); Ellis
Frank William Smith (Ag); Kingman
George Sherman Smith (ME); Independence
John Shannon Smith (Ag); Manhattan
Leslie Franklin Smith (CE); Vermillion
Lucas Burr Smith (Ar); Hutchinson
Neal Smith (ME); Belle Plaine
Rollin James Smith (ME); Topeka
Stephen Roy Smith (GS); Beloit
William Daniel Smith (EE); Vermillion
Howard Harold Snodgrass (CE); Frankfort
John Alvin Snodgrass (GS); Lincoln
Vivian Melancthon Solt (ME); Barnes
Ada Joan Songer (GS); Manhattan
John Milton Spencer (ME); Concordia
Lyman Paul Spencer (ME); Jonesboro, Ark.
Irvin Vernon Stafford (Ag); Valley Falls
Stanley Ray Stahl (Ag); Belle Plaine
Harry John Staib (EE); Turon
Arthur Raymond Stark (CE); Belleville
John Steiner (GS); White Water
Arthur William Stemmerman (ME); Piper
Everette Dewey Stewart (GS); Towanda
Fred Aye Stewart (CE); Rossville
James Scott Stewart (Ag); Coldwater
Ross William Stice (Ag); Alta Vista
*Charles Minar Stipp (CE); Urbana
Carl Henry Stirtz (AE); Abilene
Archie St. John (ME); Rocky Ford, Colo.
Edwin St. John (Ag); Rocky Ford, Colo.
Ada Caroline Stoddard (IJ); Manhattan
Austin William Stover (EE); North Topeka
Raymond Luther Stover (Ag); Topeka
Frank Hobart Stuessi (GS); Kansas City
Henry Clinton Sturgeon (Ag); Lane
Frank Arvid Swanson (Ag); Manhattan
Alva Swarner (ME); Coldwater
Eugene Rupert Sweet (Ag); Manhattan
Harold Irwin Tarpley (EE); Kansas City
Corbon John Taylor (Ag); White Cloud
Earl Daniel Taylor (ME); Concordia
Jesse Everett Taylor (Ag); Stafford
Archie Tebow (EE); Scandia
Burdette Tegmeier (GS); Manhattan
Edward Leon Temple (CE); Hutchinson
Paul Arden Tharp (CE); Winfield
Helen Thayer (GS); Manhattan
Mildred Margaret Thayer (HE); Atchison
Corinne Bertha Thiele (GS); Hanover
Earl Wesley Thompson (EE); Leon
Millard Anderson Thompson (CE); Olathe
Donald Grey Thomson (Ag); Irving
Mildred Hazel Thornburg (GS); Formoso
Rowena Malinda Thornburg (GS); Formoso
‡Clarence Jay Throne (Ag); Norton
Waldo Samuel Tippin (VM); Miltonvale
Sallie Louise Toler (HE); Anthony
Eva Lucile Travis (HE); Manhattan
Josephine Victoria Tredway (GS); La Harpe
Paul Tupper (Ag); Lecompton
Charles Lee Turley (IJ); Hutchinson
Ruth Achsah Turner (GS); Fairbury, Neb.
Rowena Turner (HE); Chanute
Wiley Baldwin Turner (Ag); Atlanta, Ga.
Joseph George Tustison (EE); Yates Center
Carl Francis Urich (Ag); Wamego
Albert Joseph Underwood (CE); Downs
Susie Unruh (GS); Pawnee Rock
Vernon Valens Van Hook (EE); Topeka
Eva Grace Van Scoik (HE); Aulne
Grace Eldora Van Tries (GS); Wellsville
Mabel Van Tries (HE); Wellsville
Winifred Helen Varner (HE); Burlingame
Guy Vaughn (GS); Wichita
Ira Nelson Vowel (Ag); Norwich
Winslow Frank Vycital (GS); Alamota
Max Harley Waddell (Ag); Olathe
Gretta Laura Wagener (IJ); Manhattan
Earl Frederick Wakefield (CE); Leon
Charles Stone Waldo (ME); Ellis
Eugene Haley Walker (Ag); Manhattan
William Marion Walker (ME); Manhattan
Lela Mae Walters (HE); Tonganoxie
Sydney Edward Walton (Ag); Sterling
Logan Byron Warlick (GS); Manhattan
Robert Lee Warren (VM); Silverdale
Eugene Albertice Waters (ME); Wellsville
Henry Jackson Waters, jr. (GS); Manhattan
Curtis Watts (HE); Winfield
Esther Waugh (HE); Amherst, Mass.
William Wallace Weaver (Ag); Gravette, Ark.
Ella Henrietta Webb (HE); Tonganoxie
Lyle Webb (GS); Topeka
Thomas Louis Weber (GS); Manhattan
‡Dwight Robert Weinland (ME); Colby
Raymond Theodore Welch (EE); St. John
James Thomas Wells (AE); Harper
Lawrence McConchie Welsh (CE); Frankfort
*Victor Wendell Welton (CE); Rantoul
Lucile Whan (GS); Manhattan
Voron Edwin Whan (GS); Manhattan
Lawrence Francis Whearty (CE); Westmoreland
Elsie Mae Whitacre (HE); Winfield
Anna Mable White (HE); Carbondale
Bert Harold White (CE); Deerfield
William Floyd White (EE); Pawnee Rock
Clifford Lyle Whitmer (ME); Norwich
Roy Donald Willhite (ME); Toronto
Clarence Preston Williams (Ag); Miami Okla.
Ervin Williams (Ag); Longford

* Deceased.

‡ Automobile Mechanics Short Course, second semester.

UNDERGRADUATE STUDENTS—FRESHMEN—concluded

Fred Woods Williams (VM); Sylvan Grove
 Kale Alonzo Williams (Ag); Elgin
 Everett Hoover Willis (Ag); Manhattan
 Charley Trago Wilson (EE); Little River
 Fred Emery Wilson (ME); Kinsley
 Heloise La Van Wilson (HE); Clay Center
 Joseph Wilson (GS); Anness
 Mary Frances Wilson (GS); Manhattan
 Maudie Margaret Wilson (HE); Sabetha
 William Clyde Wilson (Ag); Kansas City
 Herbert Truitt Windett (EE); Quenemo
 Earl Augustus Winfrey (ME); Oswego
 Albert Doud Wing (Ag); Fort Scott
 Minton Dallas Winget (Ag); Paxico
 Edwin Wilhelm Winkler (Ag); Rozel
 Milton Shipman Winter (Ag); Lecompton
 Earl Eugene Wintermute (Ag); Sedan
 Julia Ethel Wolfe (HE); Blue Mound
 Letha Irene Wolfe (GS); Johnson City
 Robert Wolnick (EE); Blair
 Earl Bowen Wood (ME); Topeka
 Louise Geraldine Woods (HE); Ellsworth
 Marvin Willard Woodward (Ag); Olathe
 Alden Woody (GS); Lincoln
 Clarence Harold Worster (EE); Manhattan
 Mabel Lucile Worster (HE); Manhattan
 Arthur Pruitt Wright (ME);
 Pawhuska, Okla.
 Glenn Alvin Wright (ME); Atwood
 Leroy Lawrence Wurst (EE);
 Russell Springs
 Louise Charles Wurtz (EE); Greenleaf
 Chester Ewart Yenawine (EE); Manhattan
 Ralph Howard Yoder (ME); Clyde
 Edwin Dewey Young (ME); Little River
 Olin Ernest Young (Ag); Neodesha
 Pauline Ross Young (HE); Manhattan
 Ralph Ellsworth Young (ME);
 Pretty Prairie
 Walter Crew Young (GS); Great Bend
 Benjamin Edward Zoll (Ag); Leavenworth
 *Albert Douglas Zook (Ag); Fort Scott

SPECIAL STUDENTS

Luis Alberto Acosta (Ag);
 Monlerrey, Mexico
 George Robert Allingham (M); Manhattan
 Christel Lorene Atchison (GS); Waverly
 Adalia Capsey Backman (M); Manhattan
 Mary Inez Backman (M); Manhattan
 Lloyd Collier Bagby (Eng.); Topeka
 Alma Jessie Bauerfield (M); Yates Center
 Marie Bechtel (Eng.); Manhattan
 Anna Marie Bellomy (M); Manhattan
 Elden Hanson Best (GS); Columbus
 Benjamin Franklin Blackledge (GS);
 Camp Funston
 Rose May Blackwelder (HE); Isabel
 George Russell Blake (GS); Winfield
 Clarence Elmer Bleckley (GS); Wichita
 Carlisle Bloxom (GS); Pratt
 Elizabeth Tracy Boon (GS); Junction City
 Franklin George Boon (GS); Manhattan
 Katharine Maxwell Bower (HE);
 Kansas City, Mo.
 Grace Waugh Bowman (HE); Manhattan
 Mildred Axtell Branine (GS); Newton
 Samuel Brehm (Ag); Hutchinson
 Mrs. Cleve Briggs (GS); Parsons
 Oliver Wendel Broberg (GS); Manhattan
 Irene Brookshier (GS); Manhattan
 Pearle Elizabeth Brown (M); Blue Rapids
 Ivy Brook Brush (M); Alexis, Ill.
 Nina Ruth Burgess (M); Manhattan
 Walter Horace Burr (GS); Manhattan
 Estella Marie Burris (M); Chanute
 Hartzell Burton (Ag); Wichita
 Florence Faison Butler (Ag); Elliott, N. C.
 Constantine Diamandis Calogeris (Ag);
 Imbros, Greece
 Joseph Cavitzel (GS); St. Paul, Minn.
 Mildred Fern Champion (M); Manhattan
 Edna Chapin (GS); Manhattan
 Arthur Bright Collom (GS); Maressa, Ill.
 James Samuel Colam (GS); Wichita
 Helen Martin Colburn (M); Manhattan
 Allen Bruce Cole (GS); Fulton Ky.
 Norris Lawrence Colson (HE); Manhattan
 Mrs. Joseph Connors (M); Denver, Colo.
 Esther Anna Cooksey (GS); Manhattan
 Commodore Cool (Ag); Manhattan
 Ennis Morrow Cooley (Ag);
 Jonesboro, Ark.
 Charles Edwin Cravens (GS); Gallatin, Mo.
 Eva Belle Cronk (GS); Manhattan
 Nina Bess Curry (M); Norton
 Carl William Danielson (GS);
 Kansas City, Mo.
 Gladys Davis (M); Mooreland, Okla.
 Walter Reuben Dedrick, jr. (GS);
 Greeley, Colo.
 Carl George Deuber (GS); Manhattan
 Mary Robbins Dillon (HE); Manhattan
 Myrtle Hutto Dodge (GS); Manhattan
 Gretchen Langdon Drake (GS);
 Manhattan
 Netta Elizabeth Dubbs (M); Ransom
 Harvey Flinn Dyer (GS); Culver
 Rolph Shortridge Edwards (Ag);
 Leavenworth
 Elsie Elizabeth Elliott (M); Marion
 Stephen Johns Fairchild (Ag); Hutchinson
 Walter Scott Ferguson (Ag); Kansas City
 Alice Fitch (M); Manhattan
 Daisy Boswell Floyd (GS); Manhattan
 Blanche Evans Forrester (HE); Manhattan
 John Mefert Fraser (GS); Manhattan
 Tate Fry (GS); Lockney, Tex.
 Bryan Franklin Gantz (Ag); Plevna
 Thomas Chester Garst (Ag); Wichita
 George Albert Gemmell (Ag); Manhattan
 Charles Gettys (Ag); Concordia
 Orville LeeRoy Gibson (Ag); Havensville
 Helen Louise Giles (Eng); Hutchinson
 Ethan McKee Gill (GS); Lyndon
 Ignacio Vazquez Gomez (Ag);
 San Antonio, Tex.
 Mary Graham (HE); Manhattan
 Lois Graves (GS); Manhattan
 Marguerite Gustavson (GS);
 San Diego, Cal.
 Benjamin John Hahne (Ag); Dodge City
 Margaret Mae Hale (GS); Lebanon
 Robert Kenneth Hale (GS); Eureka
 Lawrence James Harr (GS); Greenleaf
 Justine Mahitable Hawthorne (GS);
 Manhattan
 Myron Hays (GS); Westchester, Pa.
 Raymond Redman Henley (GS);
 Overland, Mo.
 *Archie Julius Hinzv (Ag); Kiowa
 Paul Davidson Hoffman (Eng); Abilene
 Araminta Holman (GS); Leavenworth
 Paul Eugene Holmes (GS); Manhattan
 Mabel Holmgren (HE);
 Bear River City, Utah
 Flora Pearl Hoots (M); Winfield
 Roy McKinley Huff (GS); Eldorado, Mo.

* Deceased.

SPECIAL STUDENTS—continued

Florence Hunt (GS); Pomona, Cal.	Harla Phillips (GS); Paola
Mildred Lee Inskeep (M); Manhattan	Raymond Plyley (GS); Scranton
Albert Johnson (GS); St. Paul, Minn.	Michael Ptacek (Ag); Emporia
Edith Kelly Johnson (GS); Olathe	Alvaro Vavarro Ramos (Ag);
Ernest Leonard Johnson (GS);	Bolivia, Brazil
Minneapolis, Minn.	Arthur Cecil Ramsey (GS); Osage City
Harry Franklin Johnson (GS); Cisne Ill.	Wesley Philip Reazin (Eng); Macksville
Charles William Johnston (Ag);	Alice Maurine Rice (M); Topeka
Courtland, Neb.	Herbert Reiger (GS); Wichita
John Victor Keene (GS); Ottawa	Vadah Rose Riley (GS); Spring Hill
Estee Madara Keener (HE); Kinsley	Margaret Elizabeth Hart Ritter (HE);
Helen McClanahan Keith (M); Manhattan	Topeka
Mattie Toothaker Kimball (GS); Manhattan	Willmia Seigel Roark (M); Junction City
Chester Anderson King (VM); Emporia	Susie Robb (GS); Salina
Kathryn Alberta Kinman (M); Ashland	Ethel May Roberts (HE); Westmoreland
Mrs. John Kirby (M); Manhattan	William Emmett Roberts (GS);
Bernice Wilson Klotz (M); Wilson	Omaha, Neb.
Ollie Wilson Klotz (M); Wilson	Paul Robinson (Ag); Oswego
Harold Alonzo Knapp (M);	Melvin Le Roy Rogers (Ag);
Tennessee City, Tenn.	Denver, Colo.
Rudolph William Kranshaar (GS);	Vincent Judson Rosecrans (GS); Winfield
Waverly, Iowa	Harley Dwight Ryan (GS); McCracken
Joseph Richard Krupp (Ag);	Mary Josephine Sachau (M); Manhattan
Springer, Neb.	Joseph Schulte (GS); Marysville
Dewar Ferry Kyle (Eng); Cawker City	Carl William Schulz (GS); Lamar, Neb.
Ruth Ester Lambertson (M); Fairview	Mrs. J. P. Scott (GS); Manhattan
† Robert Letzig (Ag); Richmond, Mo.	Minnie Agnes Scott (HE); Pratt
Frieda Limper (M); Manhattan	Frank Sisterman (GS); El Paso, Tex.
Ethel May Loring (HE); New York, N. Y.	Alva Edison Smith (Ag); Iola
Adelaide Louise Lutz (HE); Guthrie, Okla.	Clayton Needham Smith (Ag);
Dolly Minerva McCarthy (M); Mankato	Pawhuska, Okla.
Ferrell Goldwaite McCarty (Ag);	Mary Smith (M); Manhattan
Bolivar, Mo.	Freda Elizabeth Staats (M); Coats
Ralph Reuben McFadden (Ag);	Charles Elwin Stamps (GS);
Jonesboro, Ark.	Sweetwater, Tex.
Nelle Drake McGrath (GS); Manhattan	Charles Harold Stinson (Ag); Carlyle
Owen Floyd McKittrick (IJ); McCracken	Walter Lee Stites (Ag); Wakeeney
Sara Josephine MacLeod (M);	James Leslie St. John (Ag); Louisville
White Cloud	Hannah Helene Stueber (HE); Parsons
John Lester Markley (Ag); Augusta	Dessie Olive Thornburgh (M); Manhattan
Virgil Leslie Marks (Ag); Kimball	Clarence Herbert Torgerson (GS);
Glenn Hagen Marsh (Ag); Wichita	Giltner, Neb.
Charles Martin (GS); Elkville, Ill.	Irene Vickers (GS); Liberal
Sidney Emil May (GS); Chicago, Ill.	Otto Frederick Vogt (GS);
Florence Imogene Meyer (M); Anthony	Rochester, N. Y.
Louie Bert Micklish (Ag);	George Washington Walker (Ag); Anthony
Jonesboro, Ark.	Ruthe Leona Warbuton (M);
Levi Earl Miller (Ag); St. John	Springfield, Mo.
Harriett Alice Moffit (M); Manhattan	Bryant Good Waterbury (Ag);
Clara Ethel Montford (HE); Paola	Centerville, S. Dak.
Ross Davis Mowry (Eng); Manhattan	Christian Weber (Ag); Abilene
Dewey Newcombe (Eng); Great Bend	Ruth Ross Werts (GS); Burr Oak
Charles Nichols (Eng); Girard	Elizabeth Whitsitt (GS); Manhattan
Ray Nye (Ag); Effingham	Mary Collins Whittier (GS); Topeka
Chester Willis Oakes (Ag); Collins, Ark.	Josephine Fritz Wiegand (GS); Manhattan
Oscar Oakes (Ag); Salem, Neb.	Ethel Julia Wilhoit (M); Manhattan
Benedicto de Oliveira (Ag);	Leon Wilgus (Ag); Baldwin
Jannaria, Brazil.	¶ Fern Lucile Williams (GS); Gardner
Clarence Granville Olson (Ag);	Arthur James Williamson (GS);
Brookings, S. Dak.	Washington
Elmer Linnaens Olsson (GS); Topeka	Lucille Berry Wolf (M); Manhattan
Myra Cobb Ousley (GSO); Fort Riley	Eva Emmaline Wood (HE) Manhattan
Claude Braley Owen (GS); Reese	Lawrence Earl Woods (Eng.); Newton
* Grace Adella Palmer (GS); Newark, N. J.	Dayton Ray Yoder (GS); McPherson
Mrs. Roy Hartford Parker (GS);	Edwin Emerson Young (GS);
Manhattan	Kansas City
Clarence Hugh Pate (GS); Walnut	

* Deceased.

† In Tractor Operator Short Course, second semester.

¶ In Housekeepers' Course, first semester

SUMMER SCHOOL STUDENTS

Hattie Julia Abbott; Manhattan
Charles Royce Abernethy; Manhattan
Alto Mae Adams; Lyons
Cecyle Valentine Adams; Eldorado
Genevra Mae Adams; Atchison
Hazel Dell Adams; Eldorado
Katherine Maurine Adams; Manhattan
Pearle Akin; Manhattan
Estella May Albin; Grainfield
Jessie Patience Allen; Manhattan
George Robert Allingham; Manhattan
Myrtle Margaret Anderson; Kingman
William Hiddleson Andrews; Manhattan
Sister Mary Angelica; Selden
Sister Mary Annunciata; Salina
Mildred Jeanette Arends; Kansas City
Fanchon Easter Armitage; Manhattan
Ethel May Arnold; Manhattan
Clennie E. Bailey; Manhattan
Willette Florence Baird; Cherryvale
Helen Baker; Enterprise
Lilian C. W. Baker; Topeka
Helen Hunt Bales; Manhattan
Ivy C. Barker; Newton
Elva Stoll Barnes; Lone Elm
Mary Stepheson Barnes; Manhattan
Mildred Gertrude Barnes; Rock Creek
Bertha Rose Barngesser; Manhattan
Clara Florence Barnhisel; Wichita
Burton Bernard Bayles; Manhattan
Merle Beeman; Topeka
L. Ruth Beggs; Washington
Margaret Helen Bell; Manhattan
W. Walton Bell; Marysville
Lloyd Irvin Belveal; Delphos
Aurla Irene Bennett; Willcox, Ariz.
Evalyn A. Bentley; Valhalla
Mabel Rose Bentley; Valhalla
Blanche May Berger; Sylvan Grove
Lulu Maude Berger; Sylvan Grove
Cornelia Kratz Bess; Manhattan
Neva Betz; Beloit
Lulu Jane Beverly; Manhattan
Catherine LaHoma Binkley; Clay Center
Iva Rose Bishop; Haven
Anna Maude Blackwell; Manhattan
Helen Williamine Blank; Emporia
Clara Elizabeth Blockolsky; Manhattan
Thomas William Bonfield; Elmo
Mary Grace Boone; Lansing
Sister Mary Borromeo; Concordia
Ruth Borthwick; Manhattan
Anna Boukal; Munden
Grace Ruth Boulden; Manhattan
Katherine Marie Brandner; Everest
Olive Bray; Cleveland
Charles H. Brooks; Stockton
Florence Irene Broughton; Clay Center
A. A. Brown; Norton
Gertrude Olive Brown; Norton
Elsa Ann Brown; Manhattan
Dollie Edythe Browning; Chanute
Kathryn Browning; Chanute
Mildred Carrie Browning; Linwood
Genevieve Vador Bruce; Manhattan
Lela Jassamine Bryan; Jonesboro, Ark.
Consuelo Bullock; Kingman
Lawrence Walter Burby; Manhattan
Elizabeth Burgner; Burlington
Evangeline Burke; Manhattan
Carrie Lucile Burney; Hutchinson
Phyllis Harriet Burt; Eureka
Zella Frances Burton; Blue Rapids
Gladys Elizabeth Bushong; Manhattan
Jamie Irene Cameron; Manhattan
Frank S. Campbell; Manhattan
Georgia Elizabeth Carey; Manhattan
Lucile Margaret Carey; Manhattan
Myrtle Carey; Manhattan
June Gertrude Carothers; Hiawatha
Zattie Ofelia Carp; Wichita
Maude Ellen Carter; Tonganoxie
Dora Lydia Cate; Manhattan
Quinta Pearl Cates; Manhattan
Edna Chapin; Manhattan
Olga Elva Chappell; Haddam
Sara Chase; Manhattan
Rose Chestnut; Clay Center
Ercile Clark; Hutchinson
Frank Herbert Clark; De Soto
Gertrude Isabel Clark; Ottawa
Marian Cecile Clarks; Paola
Maude Hughlett Clingan; Manhattan
Eunice Gaines Cochran; Manhattan
Beulah Belle Coffelt; Blue Mound
Gretta Alice Collins; Belleville
Norris Lawrence Colson; Manhattan
Josephine Verna Condit; Centralia
Jesse A. Cook; Eureka
Hazel Alma Copenhaver; Manhattan
Elizabeth Agnes Cotton; Wamego
Helen C. Crane; Kansas City, Mo.
Nelson Antrim Crawford; Manhattan
Sister M. Crescentia; Manhattan
Elsie Leedom Cromley; Manhattan
Claude Brownley Cross; Manhattan
Margaret Elizabeth Crumbaker; Onaga
Mae Cullum; Manhattan
Reba Cullum; Manhattan
Rose Matilda Cunningham; Manhattan
Julia Katherine Curry; Norton
Cline Chilcote Curtiss; Scott City
May Dahnke; Manhattan
Verla Dahnke; Manhattan
Anna Elizabeth Daniel; Overbrook
Carrie Mabel Darks; McCracken
Marian Emma Darks; McCracken
Marion Davis; Manhattan
Helen Josephine Dawley; Manhattan
Laura Elgie Deadman; Manhattan
Birdie Ethel Dean; Nickerson
Maude Elizabeth Deely; Norton
Elsie Maybelle Deniston; Manhattan
Abbie Clair Dennen; Manhattan
Jessie Jane DeVault; Ocheltree
Edna Beryl Dewey; Fort Scott
Florence Lillian Dial; Manhattan
Elizabeth Dickens; Manhattan
Marguerite Luella Dickerhoof; Manhattan
Sister M. Dolores; Manhattan
Della Elizabeth Donnell; Ashland
Myrtle Doran; Clyde
Sadie Maud Douglas; Tulsa, Okla.
Fleta Douthit; Edmond, Okla.
Mary Ann Douthit; Edmond, Okla.
Odessa Della Dow; Manhattan
Marguerite Edelblute; Manhattan
Bessie Edgerton; Burlingame
Louise Edgington; Burlingame
Maggie Ellis; Westmoreland
Ruby Virginia Engler; Manhattan
Sister M. Eugenia; Herndon
Sister Mary Evangelist; Concordia
Dorothy Woodman Evans; Manhattan
Frances Floretta Ewalt; Manhattan
James William Fremont Faley; Manhattan
Anna Judith Ferguson; Mankato
Nellie Fields; Zeandale
Clarence Elmer Fisher; Kansas City
Beatty Hope Fleenor; Manhattan
Florence Hazel Floland; Almena
Daisy Boswell Floyd; Manhattan
Esther Ellen Flynn; Holton
Edna Bickenheuser Folck; Junction City
Dora Foraker; Wellington
Martha Harbord Foreman; Manhattan
Jeanne La Velle Forrester; Manhattan
Alleen Marie Forss; Manhattan

SUMMER SCHOOL STUDENTS—*continued*

Frank Elmer Fox; Manhattan
 Evelyn Rae Frank; Manhattan
 Martha Frank; Manhattan
 Edith Geneva French; Manhattan
 Julia Delilah Frost; Washington
 Grace Gardner; Hartford
 Ethel Victoria Garrett; Manhattan
 Annamae Garvie; Abilene
 Blanche Sharpe Gaston; Fort Riley
 George Albert Gemmell; Manhattan
 Mary Helen Gilbert; Manhattan
 Blanche Gilmore; Lone Wolf, Okla.
 Lura Gilmore; Manhattan
 Natalie Helen Goldsmith; Athol
 Clema Jane Gordon; Manhattan
 Mary Alice Gordon; Manhattan
 Fannie Harriet Gorton; Manhattan
 Irene Florence Graham; Manhattan
 Mary Graham; Manhattan
 Zena Charlotte Graves; Mound City
 Maude Rosaleen Greub; Salina
 Josie Margaret Griffith; Manhattan
 Ida Elizabeth Grippen; Council Grove
 Isabel Groendycke; Medicine Lodge
 Hazel Kathryn Groff; Nortonville
 Dora Grogger; Manhattan
 Emma Mae Gruber; Horton
 Francis James Guffee; Belleville
 Myrtle Guffee; Belleville
 Myrtle Annice Gunselman; Holton
 Mary Gurnea; Belleville
 Eva Maud Gwin; Manhattan
 Mary Frances Haack; Marion
 Elta Elizabeth Haeger; Manhattan
 Mrs. C. N. Hahn; Manhattan
 Maude Florence Hainworth; Blue Rapids
 Margaret Mae Hale; Lebanon
 Joseph Robert Hall; Kansas City
 Lucile Halleck; Abilene
 Sidney Raymond Hammett; Manhattan
 Elida May Hand; Clay Center
 Sadie Edith Hanna; Dodge City
 Bess J. Hansen; Manhattan
 Edna Henrietta Hanson; Manhattan
 Frank King Hansen; Manhattan
 Mae Hansene Hanson; Greenleaf
 Alice Tibbetts Harkness; Lakin
 Hildegard Elula Harlan; Manhattan
 Miriam Ellen Harling; Manhattan
 Claude B. Harris; Havensville
 Eliza Burns Harris; Cedarvale
 Gertrude B. Harris; Cottonwood Falls
 Lila Ruth Harris; Houstonia, Mo.
 Roberta Elizabeth Harris; Horton
 Stella Maude Harriss; Manhattan
 Zora Frances Harris; Manhattan
 Frances Harrop; Manhattan
 Mary Lavinia Hart; Centralia
 Dorothy Frances Hartman; Great Bend
 Eva Harvey; Osborne
 Freda Louise Haslam; Manhattan
 Martha Grace Hatch; Manhattan
 Clara Mary Haverkoot; Barnes
 Estella Hawley; Clay Center
 Vivien Heath; Peabody
 Lula Heatherington; Jennings
 Helen Lucile Heiser; Tonganoxie
 Sue V. Hemphill; Clay Center
 Florence Margaret Henderson; Bloomington, Neb.
 Cora Hendrick; Carthage, Mo.
 Mabel R. Henry; Junction City
 Alta Sarah Hepler; Manhattan
 Christie Cynthia Hepler; Manhattan
 L. Glen Hepworth; Manhattan
 Sister M. Herman Joseph; Manhattan
 Mrs. Frank W. Herriott; Manhattan
 Mrs. S. L. Herriott; Manhattan
 Clara May Hesse; St. Marys
 Esther Gladys Hilbish; Lewis
 Christine C. Hill; Mulvane
 Louise B. Hill; Manhattan
 Mabel Doerr Hill; Barnes
 Leona Mae Hoag; Ionia
 Esther Mary Hobbs; Clearwater
 Edna Letha Hoke; Manhattan
 Juanita Hoke; Manhattan
 Marvel Mae Julia Holliday; Manhattan
 Esther Evelyn Holtman; Randolph
 Rudolph J. Honomichl; Omaha, Neb.
 Grace Howard; Emporia
 Sherman Hayes Howard; Emporia
 Minta Alice Hungerford; Manhattan
 Edith Rachel Hunter; Barnard
 Mary Helen Hunter; Anthony
 John B. Hylton; Manhattan
 Edith Jones Iles; Manhattan
 Sister Mary Immaculate; Concordia
 Elise Sitty Jackson; Manhattan
 Jerry Dillard Jarmon; Coffeyville
 Edward John Jelden; Columbus, Neb.
 Erma Leota Johnson; Winfield
 Gussie Christine Johnson; Wichita
 Harold Franklin Johnson; Winfield
 Helen Myrtle Johnson; Wichita
 Annie Marie Johnston; Manhattan
 Florence Jones; Salina
 Erba Mona Kaul; Glen Elder
 Ernest Baker Keith; Manhattan
 Helen McClanahan Keith; Manhattan
 Hulda Blackledge Keith; Manhattan
 Pauline Keith; Council Grove
 Charles Kelly; Mayetta
 Exie Lee Kelly; Manhattan
 Frances Leone Keneaster; Lawrence
 Lillian Marie Kerns; Canton
 Ralph Lester Kersey; Garden City
 Katrina Kimport; Dellvale
 John Theodore King; Wichita
 Julia King; Manhattan
 Grace Lilas Kirk; Manhattan
 Elizabeth Emily Kirkpatrick; Belleville
 Marion Gibbonney Kirkpatrick; Belleville
 Harold L. Klug; Manhattan
 Mrs. H. L. Klug; Manhattan
 Ruth DeVerre Knapp; Manhattan
 Kathleen Knittle; Manhattan
 Cornelius Kraemer; Clifton
 Elizabeth Ann Lacey; Marshall, Mo.
 Joseph Ralph LaMont; Manhattan
 Mabel Ellen Lamoreaux; Waterville
 Lillian Antionette Lathrop; Manhattan
 Margaret F. Latshaw; Manhattan
 Bertha Blanche Lauger; Lindsborg
 Agnes Laughlin; Clyde
 Ella Frances Lawson; Geuda Springs
 Ione Elizabeth Leith; Irving
 Ethel Leslie; Nickerson
 Constance Lewin; Lindsborg
 Hazel Marie Lindley; Leon
 William Adams Lippincott; Manhattan
 Olive Charlotte Logerstrom; Manhattan
 Gertrude Losey; Clay Center
 Geta Lund; Manhattan
 Grace L. Lyness; Walnut
 Effie Evelyn Lyons; Topeka
 Grace Margaret Lyons; Manhattan
 Kathlene Lyons; Manhattan
 Mae Anna McCabe; Onaga
 Henrietta Vera McClelland; Manhattan
 Carrie Virginia McClure; Sterling
 Marjorie M. McClure; Blue Mound
 Ethel McCormick; Manhattan
 Sarah McCoy; Manhattan
 Helen McIlrath; Manhattan
 Anna Lee McIntyre; Topeka
 Elvira Mirian McKee; Manhattan
 Alice Edna McLean; Jewell

SUMMER SCHOOL STUDENTS—continued

Clara Opal McLean; Jewell
 Mrs. James McNee; Cottonwood Falls
 Linna Irene McTaggart; Greenleaf
 Wealthy Ann MacGregor; Lawrence
 Ora Madden; Agenda
 Paul Le Roy Mann; Manhattan
 Marie Manser; Burden
 Sister Louise Marie; Beloit
 Sylvia B. Mather; Clyde
 Opal Vance Matter; Washington
 Lucile Maughlin; Sylvia
 Hilda Lucile Maxson; Manhattan
 Elizabeth Cora May; Holton
 Chester Howard Middleton; Manhattan
 Anice Miller; Manhattan
 Bernice Ellen Miller; Horton
 Carl Paterson Miller; Manhattan
 Lloyd Rayburn Miller; Belleville
 Mollie Miller; Oswego
 Portia Elizabeth Miller; Clay Center
 Ruth C. Miller; Clay Center
 Susan Esther Millier; Tarkio Mo.
 Ethel E. Milstead; Lucas
 Rena Miller Mishler; Manhattan
 Ernest Walter Mitchell; Lovewell
 Grace Mitchell; Lovewell
 Helen Mitchell; Manhattan
 Harry Allison Moore; Manhattan
 Hilda Ruth Moore; Winfield
 Prue M. Morgan; Hays
 Ruth Ann Morgan; Neodesha
 Alice Morton; Ellsworth
 Viola May Mowbray; Junction City
 Goldie Anna Mugler; Clay Center
 Zenith R. Mullen; Manhattan
 Marianne H. Muse; Manhattan
 Blanche Mae Nason; Manhattan
 Elinor Frances Neal; Topeka
 Florence E. Neely; Abilene
 Raymond Reed Neiswender; North Topeka
 Elsie Josephine Nelson; Manhattan
 Nora Jerome Nichols; Manhattan
 Jane Katharine Nixon; Peck
 Lois Flanders Noble; Manhattan
 Mayme A. Norlin; McCracken
 William Axtell Norman; Manhattan
 Dorothy Elizabeth Norris; Topeka
 Anna Rose Oberhelman; Leonardville
 Ursula Oldham; Winfield
 Bess Oliphant; Columbus
 Amanda Christina Olson; Brookville
 Alpha Irene O'Neil; Paola
 Ruth Elizabeth Orr; Manhattan
 Ruby Elizabeth Orth; Manhattan
 Reeves Ayers Osborne; Burrton
 Bertha Frances Owens; Goff
 Gertrude Emeline Palmer; Hays
 Marjorie Marchbank Parker; Manhattan
 Edith Parkhurst; Kinsley
 Donald Frederick Partridge; Delphos
 Sister Mary Patricia; Manhattan
 Hazel E. Patterson; Kansas City
 Nellie Maria Payne; Manhattan
 Annette Woodward Perry; Manhattan
 Willis Campbell Perry; Mildred
 Margaret Emily Peterson; Garrison
 Mathilda Caroline Peterson; Simpson
 Ruth Rosabel Phillips; Ottawa
 Perie Richmond Pitts; Manhattan
 Blanche Marie Platt; Manhattan
 Eva Mildred Platt; Manhattan
 Anna E. Poland; Manhattan
 Lael Louise Porter; Deadwood, S. Dak.
 Minnie Opal Pottorff; Severy
 Ada May Preshaw; McPherson
 Gwendolyn Irene Priest; Greenleaf
 Faith Proctor; Norton
 Chester Floyd Quear; Atlanta Ind.
 George Hemrod Railsback; Manhattan
 Jesse Clifton Ralphs; Manhattan
 Grace Elizabeth Ratliff; Ogden
 Edna Irene Rawlings; Eureka
 Phoebe Frances Rebstock; Newton
 Lloyd D. Reynolds; Clayton
 Fred A. Rhine; Zeandale
 Emma C. Richards; Manhattan
 Gladys Riddlebarger; Manhattan
 Ruth Myrtle Ridley; Topeka
 Ethel May Roberts; Westmoreland
 Katie Mable Roberts; Manhattan
 Dora Belle Robertson; Columbus
 Margaret Robinson; Manhattan
 Nell Robinson; Manhattan
 Mabel Florence Rock; Bird City
 Sibyl Frances Rose; Rosedale
 Amanda Christina Rosenquist; Osage
 Sister M. Rosina; Manhattan
 Zelma A. Ross; Sterling
 Helen Rowles; Wamego
 Lelah Rubart; Great Bend
 Gladys Irene Rude; Wellington
 Lenora Olive Rude; Manhattan
 Grace Ethelyn Rudy; Manhattan
 Mona Agnes Rudy; Manhattan
 Hazel Russell; Wichita
 Pearl Holladay Russell; Blue Rapids
 Grace Elvena Sachau; Manhattan
 Victoria Mildred Saunders; Manhattan
 Helen Agatha Sawyer; Lincoln, Neb.
 Martha Esther Scheu; La Crosse
 Lucretia Scholer; Milo
 Margaret Washburn Schultz; Manhattan
 Dale Schwartz; Manhattan
 Myra Scott; Manhattan
 Mrs. James Sealey; Manhattan
 Georgia Martha Sedivy; Blue Rapids
 Helen Libbie Sedivy; Blue Rapids
 Adelaide Seeds; Topeka
 Salome Caroline Seitz; Hollenberg
 Lillian Lucile Sewell; Hiawatha
 Laura Edna Shingledecker; Manhattan
 Lillian Edith Sisson; Manhattan
 Florence Alberta Sitko; Dawson N. M.
 Ethel Agnes Sitterley; Manhattan
 Maud Ernestine Sjolander; Topeka
 Caroline Elizabeth Sloop; Manhattan
 Bessie Matilda Smale; Manhattan
 Elsie Harriet Smith; Westville, Ind.
 Mary Katherine Smith; Manhattan
 Naoma A. Smith; Ottawa
 Nellie Geneva Smith; Clay Center
 Luella M. Snay; Nortonville
 Charlotte Flohr Solomon; Manhattan
 Lloyd Benham Souders; Manhattan
 Edna Grace Soupen; Manhattan
 Iva Spangler; Sharon
 Gladys Woods Standridge; Bisbee, Ariz.
 Ethel Mary Stateler; Liberal
 Minnie E. Sterling; Clay Center
 Ina Geraldine Stewart; Wamego
 Lena Harriet Stewart; Norton
 Esther Elizabeth Stonge; Riley
 Iva Viola Strebel; Alton
 Everett Stroud; Holton
 Mary Milligan Stroud; Holton
 Mary Strunc; Belleville
 Hazel Olive Sturgeon; Belpre
 Jean Clara Swan; Topeka
 Elsie M. Swanson; Manhattan
 Ethel Gladys Switzer; Emporia
 Blanche Lovina Tanner; Manhattan
 Edna Fern Taylor; Hugo, Colo.
 Mabelle LaVonc Taylor; Zeandale
 Mary Fidelia Taylor; Newton
 Lila Ingham Thomas; Manhattan
 Ruby A. Thomas; Argonia
 Rose Viola Tipton; McPherson
 Rolla Williams Titus; Manhattan

SUMMER SCHOOL STUDENTS—*continued*

Zorada Zerna Titus; Topeka	Mrs. J. R. Werts; Manhattan
Elva May Tudor; Stockton	Nannie Agnes Wesley; Bancroft
Alberlina Tulloss; Ottawa	Edward Staunton West; Manhattan
Alice Marian Turner; Manhattan	Lelia Faye Whearty; Westmoreland
Zenolia Turner; Geneseo	Brenner Bagnail White; Delphos
Eva Lillian Tyson; Manhattan	Myrtle Ione White; Jewell
Gertrude Uhley; Fairbury, Neb.	Emma S. Whitton; Kiowa
Mark Florea Upson; Sabinal, Tex.	Flora E. T. Wiest; Manhattan
Ethel Vanderwilt; Manhattan	Gladys Wilcox; Manhattan
Ethel Grace Van Gilder; Manhattan	Sister M. Wilhelmina; Concordia
Mary Cathryn Van Vleck; Rossville	Edythe May Wilson; Manhattan
Helena Mary Viers; Manhattan	Frank C. Wilson; Manhattan
Sister Mary Virginia; Park	John Cathcart Wilson; Manhattan
Perttu Hannes Virtanen; Manhattan	Lillian Mabel Wilson; Strong City
Elizabeth Doris Wadley; Kansas City	Nettie May Wismer; Pomona
Gretta Laura Wagener; Manhattan	Chester Stanley Wood; Manhattan
Edith Mary Walsh; Manhattan	Eva Emaline Wood; Manhattan
Glen Chase Ware; Larned	Gerta Louise Woodruff; Ogden
Edna Warner; Garden City	Grace Woodward; Glasco
Frances Elizabeth Washington; Manhattan	Julia Minerva Wright; Clay Center
Henry Jackson Waters, jr.; Manhattan	Nellie Flo Yantis; Manhattan
Mary Waterson; Munden	Marie Esther Zeller; Waterville
Fern Vena Weaver; Wakefield	Katharyn Phoebe Zipse; Jewell

Students in Special Courses

The abbreviations following the names of students have the following significations: AMSC, automobile mechanics' short course; BSC, blacksmiths' short course; CSC, carpenters' short course; CrSC, creamery short course; DSC, drafting short course; ESC, electrical short course; FSC, farmers' short course; FdSC, foundry short course; HSC, housekeepers' short course; MSC, machinists' short course; ROSC, radio operator's short course; SA1, School of Agriculture, first year; SA2, School of Agriculture, second year; SA3, School of Agriculture, third year; SASp, School of Agriculture, special; TOSC, tractor operators' short course.

Harry Franklin Abbott (FSC); Lebanon	Ross David Arnold (TOSC); Manhattan
Elver Childers Akers (AMSC); Aline, Okla.	Glenn F. Artley (FSC); Bristof, Ind.
Albert Adolph Akrem (MSC); Oil City, Pa.	Allen Kelehner Asher (FSC); Officer, Colo.
Claretta Odessa Allen (HSC); Wynnewood, Okla.	Lawrence Martin Attebury (FSC); Valencia
Harold Blackburne Allen (AMSC); Garrison	Bernard E. Austin (TOSC); Manhattan
John Kenneth Allingham (TOSC); Manhattan	John Leslie Axley (SASp); Overland Park
Charley E. Alms (BSC); Blanche, Mo.	Laurence Lucile Baber (HSC); Mentor
Anne Susie Amstutz (SASp); Halstead	Lyman Elwin Bailey (AMSC); Logan
William Pete Amstutz (AMSC); Halstead	John William Balderson (AMSC); Wamego
Annas Lee Anderson (TOSC); Wichita	Cecile Iona Baldwin (SASp); Manhattan
Cressie Welcome Anderson (SASp); Minneapolis	Leonard Elbert Bales (TOSC); Manhattan
Neil Williams Anderson (FSC); Topeka	Richard Roscoe Ball (AMSC); Lyons
Oliemay Arvilla Anderson (SASp); Minneapolis	Guy Alvin Ballard (AMSC); Pattonsburg, Mo.
Ralph Waldo Anderson (SA3); Manhattan	James Henry Banta (FSC); Golden City, Mo.
Tilbert S. Anderson (TOSC); McPherson	William Frederick Barber (TOSC); Lincoln
Wayne Elsworth Anderson (AMSC); Manhattan	Frank J. Barcafer (SASp); Manhattan
William C. Anderson (FSC); Carlinville, Ill.	George W. Barlow (AMSC); Jameson, Mo.
George Anspaugh (FSC); Ransom	*Errol Guy Barnes (TOSC); Milton
Archibald Bertrand Armstrong (SASp); Manhattan	Ernest Barr (FSC); Holt, Mo.
Robert Max Armstrong (SASp); Manhattan	Herbert John Barr (TOSC); Larned
Harold William Arnold (AMSC); Cheyenne Wells, Colo.	Earl Jennings Barragar (TOSC); Liberty
	Scottie Windfield Barragar (TOSC); Dearing
	Fred August Barre (TOSC); Tampa
	George Henry Barrett (DSC); Eau Claire, Wis.
	Reuel Vernon Barrington (SA3); Sedan

* In School of Agriculture, first semester.

STUDENTS IN SPECIAL COURSES—continued

James Lewis Barry (FSC); Manhattan	Ralph Omar Brown (AMSC);
Elmer Lawrence Barrow (AMSC);	Barnett, Mo.
Ellinwood	Herman H. Bruns (MSC); Morse Mill, Mo.
Charles Otis Bates (AMSC); Dighton	Charles Walter Bryan (TOSC);
Delmer Cecil Battin (AMSC);	Manhattan
Carl Junction, Mo.	William McKinley Bryan (FSC); Lincoln
Rolla Edwin Bausman (FSC); Parsons	William Henry Buck (FdSC); Ogden
Burton Bernard Bayles (SASp);	Arthur Harold Buhner (FSC); Chapman
Manhattan	Harry Bullock (AMSC); Berryton
Keith Wilfred Beardmore (SASp);	William Jackson Bunch (FSC);
Concordia	Attica, Ind.
Henry Oliver Benedict (TOSC);	Louis Vencil Burlie (SA2); Anthony
Bennington	Lee Joal Burnett (TOSC); La Cygne
Carl Bannard Benson (CrSC);	John Burnham (FSC); Leon
Randolph, Mo.	Bernard Nesbitt Burns (FSC);
Verne Stanton Bentley (SASp); Jerome	Camp Funston
John Weaver Berger (FSC); Douglas	Osceola Hall Burr (SASp); Manhattan
Arthur Jabez Berry (FSC);	Thomas Martin Butler (SA2); Glasco
Lexington, Neb.	Floyd Thornton Bushnell (AMSC); Green
Hobart Stanley Berry (DSC); Rydal	John Joseph Butler (FSC); St. Louis, Mo.
Thomas Glen Betts (SA3); Detroit	Nelson Floyd Butts (AMSC);
John William Beyer (TOSC); Gridley	Plainview, Neb.
Melvin J. Binford (SASp); Haviland	Guy Walker Caldwell (SA1); Harlan
*Ernest Alwyn Bird (FSC); Dillon	Andwin Hobart Campbell (FSC); Basil
Robert F. Blanks (SASp); Manhattan	Benzun August Campbell (SASp);
Ross King Blaylock (FSC); Smith Center	Morganville
Walter Thompson Bleakley (FSC);	Frank Campbell (SAASp); Sylvia
Lawrence	James Burk Campbell (AMSC); Manhattan
Jean Donald Blossom (SASp); Manhattan	Harry Oscar Canterbury (ROSC); Elwood
Myra Lorena Blue (SA3); Detroit	Fern Frank Cappus (ESC); Argonia
Jesse Robert Blunt (AMSC);	Ralph Waldo Carey (FSC);
Milwaukee, Wis.	Lake Preston, S. Dak.
Alice L. Bobek (SA3); Caldwell	Caton Edwin Carney (AMSC); Brookville
Edna LuElla Boda (HSC); Barnes	Louis Ira Carpenter (CSC); Council Grove
Gilbert Mozey Boddington (CSC);	Henry Jensei Carr (FSC); Jamestown
Kansas City	Harvey Vernon Carrier (SASp);
Roy Bogner (FSC); Winfield	Hutchinson
Alva Jonathan Bogue (SASp); Manhattan	Floyd Casement (FSC); Sedan
Earl Lawrence Bogue (SA1); Manhattan	Theiston Abner Casey (AMSC); Chetopa
James Lloyd Boller (TOSC); Geuda Springs	Myron Glenn Cassidy (SASp); Manhattan
*Ray Vernon Bolz (AMSC); Hesston	Gettes Earl Cauble (TOSC);
William Bongart (AMSC); Ellis	Lawsinham, Pa.
Charles Alice Boschert (MSC);	Dale H. Chapin (FSC); Cheney, Minn.
St. Louis, Mo.	Olga Elva Chappell (SASp); Haddam
Frances Eugene Botkin (FSC); Fowler	Frank Herbert Chesky (ROSC); Wichita
Carl William Bower (SASp);	Merle Louise Chew (TOSC); Kimball, Neb.
Eagle Rock, Mo.	Posey Chilton (FSC); Caruthersville, Mo.
Margaret Adeline Bowen (HSC); St. John	Charles Edward Christoph (TOSC);
Harold Bryan Bowman (CSC); Valeda	Carbondale, Ill.
Charles G. Boyer (FSC); Oxford	Clarence Virgil Clark (AMSC); Hays
Marion Azalia Brabb (HSC); Alta Vista	Virgil Clayton (FSC); West Frankfort, Ill.
George Bradburg (TOSC); Minneapolis	Joseph Peter Closen (AMSC); Andale
Fred August Braum (AMSC);	Clyde Corwin Clubine (FSC);
Council Grove	Independence
Willie Jacob Braum (TOSC);	Ernest Benjamin Coffman (SASp);
Council Grove	Lawrence
Fred Aubrey Bremer (TOSC); Dresden	Samuel Edmund Coffman (ROSC);
Leo Charles Brennan (FSC);	Independence
Bonner Springs	William A. Collier (AMSC); Mount Hope
Christiana Lovina Brewbaker (SA2);	Alfred T. Coltharp (AMSC); Bala
Manhattan	Ida Augusta Conrow (SA2); Manhattan
Walter Leslie Brewer (MSC); Concordia	William Amv Conrow (SASp); Manhattan
Albert Paul Brickler (TOSC); Wichita	Bernard Conroy (SA2); Manhattan
William Alfred Bridgford (FSC);	Merle Warren Converse (TOSC); Eskridge
Ponca, Neb.	Earl Manly Cook (FSC); Dillon
Anna Rosetta Briggs (SA1); Protection	John Cook (AMSC); St. Francis
Rexford James Briggs (DSC);	Justin Bert Cooke (TOSC); Haviland
Sault Ste. Marie, Mich.	Charles James Coon (SASp); Manhattan
Thomas Broadbent (AMSC); Cedar, Minn.	†Robert Stanley Coon (SA1); Manhattan
Alvin Stanley Brooks (DSC); Mulvane	Ethel Rose Cooper (HSC); Hoxie
Dee Talmage Brooks (FSC); Havana	Elmer Leroy Copeland (CSC); Blue Hill
†Nelson R. Brooks (SA2); Winfield	Clifford H. Cornwell (FSC);
Peter Glen Brower (FSC); Willard, Mo.	Ingersoll, Okla.
Anson McLauren Brown (SASp);	Leslie James Courtney (AMSC);
Fall River	Copan, Okla.
Merle Raymond Brown (SA3); White City	

* In School of Agriculture, first semester.

† In Machinists' Short Course, second semester.

‡ In Tractor Operator Short Course, first semester.

STUDENTS IN SPECIAL COURSES—*continued*

- Charles Edwin Couch (SASp); Anthony John Harold Cowen (SASp); Fort Scott
Charles Louis Cox (FSC); Erie
Ernest Merritt Cox (TOSC); Utopia
Charles Wilmer Crawford (FSC);
Albion, Ill.
Arthur Weston Crocker (SASp);
Matfield Green
Earl Carlton Crooks (FSC); Salem, S. Dak.
Elbridge William Crowl (SA1); Manhattan
Ruby Elizabeth Crowl (SA1); Manhattan
Ruth Brown Crowson (SASp); Manhattan
Pearl Francis Darnold (FdSC); LaHarpe
Sidney Francis Dasher (BSC); Dwight
Robert Ivan Davis (TOSC); Enid, Okla.
Walter George Denholm (TOSC);
Tonganoxie
Clinton A. Detter (TOSC); McPherson
George Frederick Dikeman (AMSC);
Niotaze
Olin Loue Dikeman (AMSC); Niotaze
Raymond Dikeman (AMSC); Niotaze
Myrtle Clair Dickerhoof (SASp);
Manhattan
Duncan Dillon (AMSC); Cook, Neb.
Lauren Dillon (AMSC); Manhattan
Howard Raymond Donaldson (TOSC);
Belleville
Stanley John Doney (AMSC); Chicago Ill.
Arthur Winford Donnell (AMSC);
Seymour, Ind.
Kenneth Bancroft Donnell (SASp);
Sterling
*James William Donovan (ESC);
Hutchinson
Roy Donovan (ESC); Bucklin
Clarence Floyd Drake (BSC); Fredonia
James Deering Dresser (FSC); Piper
Edward Oscar Dubock (AMSC); Troy
Ollie J. Duncan (AMSC); Coffeyville
James R. Dunlap (MSC); Ryan, Iowa
James William Dunlap (SASp); Carlyle
Albert John Durst (FSC);
Appleton City, Mo.
Charles Danver Dyer (ESC); Clifton
Lois Elizabeth Dyer (HSC);
Kansas City, Mo.
James Paul Eaman (AMSC);
Oak Park, Ill.
Ray Edward Early (SASp); Topeka
Abraham East (AMSC); Nash, Okla.
Ashford Robert Edie (SA1); Topeka
Charles Page Edie (SA1); Topeka
Lewis William Edwards (DSC); Kincaid
Oscar Daniel Ekstrum (AMSC); Frankfort
Rush Walter Ellenberger (TOSC); Bazine
Henry Orvil Ellerman (TOSC); Potter
Clyde M. Elliott (TOSC); Hallowell
Frank Shields Elliott (SASp); Reece
Hazel Geneal Elliott (SASp); Marion
Clarence Cornelius Erickson (TOSC);
Elsmore
Richard Andrew Ericson (TOSC);
Junction City
William Ernst (TOSC); Arrington
Newton Thompson Eshbaugh (FSC);
Festus, Mo.
Charles Esslinger (SASp); Madison
George Jacob Evans (AMSC); Onaga
John Foulkes Evans (AMSC); Chicago, Ill.
Ray Hunter Ewalt (SASp); Manhattan
Julius Christopher Fabel (TOSC);
San Pedro, Cal.
Mary Anne Fankhouser (SA2); Madison
Will Charles Fankhouser (TOSC); Madison
William McKinley Farr (AMSC); Stockton
Jessie Agness Farvis (HSC); Winchester
Gilbert A. Faulkender (AMSC); Holton
James Weaver Fields Fennell (FSC);
Elk Point, S. Dak.
Dell Fenton (AMSC); Hutchinson
Frederick Millard Field (ROSC); Columbus
Herbert Loren Fields (ESC); Garden City
Clinton Bernhardt Finvold (AMSC);
Topeka
Edwin Merrill Fisk (AMSC); Galena, Mo.
John Russell Fisk (AMSC); Coffeyville
James Aaron Fitzgerald (CSC);
Bellevue, Mo.
Albert Loring FitzRoy (ESC); Wichita
Vernett Edward Fletcher (SA2);
Manhattan
Clarence Elbert Foltz (TOSC); Manhattan
Grace Rebecca Foltz (SA1); Wakarusa
Daniel Hugh Forbes (FSC); Carbondale
Harold Hurst Fortner (SASp); Sedan
Clarence Emerson Fosdick (CSC);
Andover, Mo.
Lewis Klons Foster (ESC); Republic
Robert Jerome Foulke (FSC); Lawrence
Otis Lester Franklin (TOSC); Hepler
James McCreary Franks (FSC);
Hennessey, Okla.
Harvey Bartlett Freeman (SA2); Wichita
Paul Chalmer French (FSC); Edna
Chester Arthur Fritts (FSC); Quinter
Gustave August Fritz (MSC);
New York City, N. Y.
Raymond Glenn Frye (SASp); Freeport
Albert Edward Gage (AMSC);
Fairbury, Neb.
Clarence Marshal Garten (AMSC);
Abilene
Christian Paul Garver (TOSC); Abilene
Victor Leonidas Gaston (TOSC);
Hutchinson
Clarence Raymond George (SASp);
Manhattan
Charles E. Gettys (FSC); Wayne
Oliver Otis Gibson (FSC); Americus
Emil H. Giegling (AMSC);
Monroe, S. Dak.
Timothy Bernard Gillgannon (AMSC);
Delia
Jay Winfield Glass (FSC); Hutchinson
Karl Arthur Glatt (SASp); Enterprise
Edwin Kinsley Glover (SASp); Meriden
Edward Goerke (AMSC); Irvington, N. J.
Emilio Vazquez Gomez (SA3);
San Antonio, Tex.
John Goodrum (FSC); Mayfield
Dan O. Gordon (SASp); Manhattan
Gurney Edward Gordon (AMSC);
Warsaw, Ill.
James A. Gorton (TOSC); Manhattan
Otis J. Gould (SA2) Manhattan
Emmett S. Graham (SASp); Manhattan
Lola Jane Graham (SASp); Manhattan
Milian Kristian Grasmø (ESC);
Canton, S. Dak.
Edward Huford Greeley (AMSC);
Manhattan
Henry John Griebel (BSC); Little River
Clonnie Wriston Griffin (FSC);
Unionville, N. C.
Thomas Edward Grinstead (DSC);
Meeker, Colo.
Carl Edward Grittman (ESC); Glasco
Quincy Adam Groh (TOSC); Wathena
Francis Edward Gromley (TOSC);
Purcell
Rexford Guipre (SASp); Simpson
Gladys Mae Gullickson (HSC); Manhattan
Lena Irva Gunselman (SA1); Holton

* In School of Agriculture, first semester.

STUDENTS IN SPECIAL COURSES—*continued*

- Theodore Karl Guss (FSC); Coldwater
 Alexander T. Hagans (CSC); Manhattan
 Frank Alexander Hagans (SASp);
 Manhattan
 Alfred Towald Hagen (FSC);
 Webster, S. Dak.
 Clifford Elden Hahn (FSC);
 Wilmington, O.
 Young Hale (FSC); California Mo.
 Joseph Robert Hall (SASp); Kansas City
 William Thomas Hall (FSC);
 Edwardsville
 Clinton Failer Halverstadt (TOSC);
 Oxford
 Winfred Leonidas Hamilton (TOSC);
 Miller, S. Dak.
 Thomas Elmo Hammock (FSC);
 Locust Grove, Ga.
 Harvey Peter Hanson (FSC); Concordia
 Wagner Peter Sommer Hanson (AMSC);
 Arlington, S. Dak.
 Theodore Edwin Harding (SASp);
 Lawrence
 Lester L. Harmon (AMSC); White City
 Wilma Gwendolyn Hartley (SASp);
 Manhattan
 Carl Harvey Hartman (TOSC); Scottsville
 Ernest Lewis Hartness (CrSC);
 Maryville, Mo.
 Edgar Harvey (ROSC); Stotts City, Mo.
 Ray Edgar Hawbecker (FSC); Marion
 Merlin Wilson Hawk (TOSC); Salina
 Edna C. Hawkinson (HSC); Marquette
 John Robert Hayden (FSC); Ruleton
 Edward Bernard Heddinghaus (FSC);
 Moberly, Mo.
 Albert Edward Hedges (AMSC);
 Sarpy, Mont.
 William Dudley Hedrick (AMSC);
 Gardner
 Edwin Hedstrom (SA2); Manhattan
 Ernest Martin Heer (AMSC); Riley
 Harry Heeren (MSC); Chancellor, S. Dak.
 William George Heidrick (AMSC); Beloit
 David M. Heilman (BSC); Clay Center
 John Clarence Heim (FSC); Emporia
 Oril Hemphill (FSC); Partridge
 Leslie Viedt Henderson (FSC);
 Nevada, Mo.
 Elmo H. Henningsen (CSC); Tully
 Christie Cynthia Hepler (SCSp);
 Manhattan
 Charles Berton Hepner (FSC); Mentor
 Frank M. Herman (FSC); Marshfield, Mo.
 Ernest Earl Herren (AMSC); Manhattan
 Jack Herrin (SASp); Pratt
 Howard Charles Hersel (AMSC);
 Manhattan
 Caldwell Valdeman Hessin (SASp);
 Manhattan
 John William Hickert (FSC); Lenora
 Randall Conrad Hill (SA2); Manhattan
 Ross Wayne Hill (SASp); Manhattan
 Myra Gladys Hiner (SASp); Manhattan
 William Thomas Hinman (SASp);
 McCracken
 *Mark William Hirsig (FSC);
 Cheyenne, Wyo.
 Joseph Hisek (DSC); Tyndall, S. Dak.
 Ira Francis Hites (MSC); Windom
 Marcus Alexander Hites (MSC); Windom
 Arthur Nelson Hochstedler (AMSC);
 Manhattan
 Edwin Homer Hochule (TOSC); Holton
 Wilbur Hymelions Hockett (TOSC);
 Eudora
 Fred Lauren Hoffand (TOSC);
 Antioch, Neb.
 Clarke Hogan (SASp); Junction City
 Claude Edward Hollenbeck (TOSC);
 Linwood
 John Stephen Holloway (AMSC);
 Leocompton
 Orville Bryan Holman (FSC);
 Geuda Springs
 Clifford Holmes (BSC); Marshall, Mo.
 Charles Andrew Holmquest (AMSC)
 Yates Center
 Avery C. Homewood (FSC); Luray
 Earl Robert Honeywell (SASp); Manhattan
 Florence Honeywell (HSC); Manhattan
 James Wing Honeywell (SASp);
 Manhattan
 Peter Horchem jr. (SASp); Ransom
 Stella Horchem (SA3); Ransom
 James V. Hosford (TOSC); Rulo, Neb.
 William Virgil Houser (FSC); Niotaze
 George Lee Howard (SASp); Mulvane
 Alexander Wilson Howell (FSC);
 Macksville
 George Edmund Howell (DSC);
 Sterling, Ill.
 John William Huber (AMSC);
 St. Louis, Mo.
 James Wesley Hudgen (SA1); Altamont
 Joseph Harris Hudson (ROSC); Topeka
 Harold Humburg (SA2); Bison
 William McKinley Hungerford (AMSC);
 Randolph
 Charles William Hunter (FSC); Eureka
 Ralph Edward Hunter (TOSC); Manhattan
 Raymond Lee Hunter (TOSC); Manhattan
 Archibald Hurtgen (MSC); Manhattan
 Herbert Lavine Huston (AMSC);
 Manhattan
 George Emerson Hutto (TOSC);
 Otis, Colo.
 Vardry Amon Hutton (FSC); Wauneta
 Howard Riley Huyler (FSC); Burdick
 Bernard Hurkman (AMSC); Chicago, Ill.
 Charles Clifford Jackson (TOSC);
 Manhattan
 Elise Jackson (SASp); Manhattan
 Florence Amelia Jacobs (SA2); Mayetta
 Louis Jahnke (TOSC); Leonardville
 Edwin Andrew Jerde (ESC);
 Sisseton, S. Dak.
 Adelia Cornelia Johnson (SA1); Garrison
 Axel Evald Johnson (TOSC);
 Colone, S. Dak.
 Arthur Robert Johnson (TOSC); Perry
 C. J. Johnson (TOSC); McPherson
 Ferdinand Johnson (CSC);
 Westburg, Minn.
 Fred Hans Johnson (TOSC); Waldron
 Herbert Wales Johnson (AMSC);
 Hutchinson
 Irving Albert Johnson (ROSC);
 Racine, Wis.
 Lenore Marie Johnson (SA1); Garrison
 Lloyd McKim Johnson (CrSC);
 Jerico Springs, Mo.
 Lula Anette Johnson (SASp); Walsburg
 Myrtle Naomi Johnson (SASp);
 Leonardville
 Ralph Nevins Johnson (AMSC); Delavan
 Roy William Johnson (TOSC);
 Arkansas City
 Virgil W. Johnson (AMSC); Frankfort
 Wendell Augustus Johnson (FSC);
 Elk Point, S. Dak.
 Orval Ernest Jones (SA1); Belleville

* In School of Agriculture, first semester.

§ In Housekeepers Short Course, first semester.

STUDENTS IN SPECIAL COURSES—continued

- Elmer Josephson (BSC); Holding, Neb.
 Henry D. D. Karns (SASp); Ada
 John Louis Kavanagh (SASp); Blaine
 Lucile Henrietta Keen (HSC); Kansas City
 Oliver Franklin Keesling (MSC);
 Mangum, Okla.
 Grant Kelly (FSC); Belleville
 *Elton Ferdinand Kemmerer (TOSC);
 Mankato
 John Calvin Kendall (FSC); Gaylord
 John Wesley Kendall (AMSC); Boise, Ida.
 Jay Robert Kent (AMSC); Ogden
 Esther Helene Keys (HSC); Winchester
 Eva Sarah King (SASp); Emporia
 Herbert Bernard King (AMSC);
 Arkansas City
 Louis Fred Klann (CrSC); Chilton, Wis.
 Ernest Roosevelt Knight (FSC); Chapman
 Theodore Augustus Knox (SA3); Frankfort
 Martin Melvin Knudtson (FSC);
 Bryant, S. Dak.
 George Kochis (AMSC); Camp Funston
 Edna Mary Kohler (SASp); White City
 Ernest Kohler (SA1); Forest Park, Ill.
 Lillian C. Kohler (SA1); White City
 Fred Henry Krehbiel (SA1); Pretty Prairie
 Arcy Krey (BSC); Zenith
 Harvey Burton Krey (FSC); Zenith
 Louise Anne Krighaum (FSC); Topeka
 Milton Edward Labadie (SASp);
 Pawhuska, Okla.
 Harold Lachenmaier (TOSC); Miltonvale
 Irl Weaver Laird (MSC); Harper
 Carl Leonard Lakeman (SASp);
 Morganville
 Harry Sparks Lamborn (AMSC);
 Burlington
 Floyd Martin Landis (FSC); Kansas City
 Virtus Theodore Langley (SA1); Jerico
 Jules Estes Lappin (FSC); Logan
 Robert Isadore LaRocque (ESC); Glasco
 Carl Oscar Emanuel Larson (FSC); Riley
 Emma Christine Larson (SASp); May Day
 Oscar Rudolph Larson (FSC); Chanute
 Chester A. Lashley (FSC); St. Francis, Mo.
 Roberta Mabel Laundry (SA1); Army City
 Arden Ward Lawrence (FSC);
 Spencer, Iowa
 James Lynn Lawrence (TOSC); Fall River
 Victor Valentine Lawrence (AMSC);
 Fall River
 Walter Margrave LeClere (SASp);
 Preston, Neb.
 Leon Ivan Leochner (ESC); Ludell
 Edwin Lawrence Lee (AMSC);
 Estelline, S. Dak.
 Linwood L. Leonard (SASp); Eldorado
 Ralph Hobart Leonard (FSC); Lyons
 Roy William Lewelling (TOSC); Delia
 Leora Zella Lewis (SASp); Lawrence
 Walker Eugene Lewis (FSC);
 Fredericktown, Mo.
 Gerhard Fred Lickteig (FSC); Garnett
 Wilfred George Liddiard (CSC);
 Pukwana, S. Dak.
 Bland Limbaugh (FSC); Sedgwick, Mo.
 Ellen Wilma Lind (SA1); Manhattan
 Paul Addie Lindholm (SASp); Cheney
 Paul John Link (SASp); Chase
 Albert Lillum Linn (AMSC); Clyde
 Donald Linn (FSC); Louisiana, Mo.
 Frank Missimer Lindsay (TOSC);
 Bunker Hill
 Ralph Francis Linnebur (TOSC);
 Goddard
 Irl Speed Linville (FSC); Dawn, Mo.
 George Aubrey Locke (AMSC); Belvue
 °Harvey Arnold Lord (SA1); Leavenworth
 Charles Matthew Lough (TOSC); Burdick
 Gustav Adolph Lueker (TOSC);
 Lincolnville
 Martin Henry Lueker, jr. (TOSC);
 Lincolnville
 Ignaz Luksic (AMSC); Joliet, Ill.
 Frank Elmer Lutz (TOSC); Lone Star
 Leo Marvin Lyles (FSC); Latham, Mo.
 Burton Henry Lynde (SASp); Rossville
 Andrew Finlay Lyon (SASp); Detroit
 James Everett Lyon (SA3); Manhattan
 Walter Edward Lyons (FSC);
 Mountain Grove, Mo.
 Randolph Francis McCarty (DSC);
 Cedar Rapids, Iowa
 Helen Jean McCormick (HSC); Zeandale
 John Melville McCormick (AMSC); Leona
 William Wilder McCullough (SA1);
 Irwin Hamilton McCutchan (TOSC); Alma
 Carroll William McDonald (SASp);
 Plainville
 Roy McGee (AMSC); Smithfield, Neb.
 Eugene Joseph McGrath (TOSC);
 Manhattan
 Joseph Dawson McHolland (AMSC);
 Chillicothe, Mo.
 Curtis Alexander McKeeman (SA1);
 Manhattan
 Harley Sampson McKern (TOSC);
 Millgrove, Mo.
 George Orville McKown (ESC);
 Garden City
 William Elmer McManis (AMSC);
 Manhattan
 John Nicholas Maichen (FSC); Chicago, Ill.
 Karl Frederick Maier (AMSC);
 Kansas City, Mo.
 Luther Carl Main (FSC); Pittsfield, Ill.
 Chris John Mall (TOSC); Clay Center
 Ralph Reuben Malmquist (AMSC);
 Chicago, Ill.
 Ethel Lenora Manwarran (SA3);
 Geneseo
 Esther Ann Mapes (SA1); Manhattan
 William Herbert Marcy (TOSC); Spivey
 Howard J. Margrave (SASp);
 Preston, Neb.
 Hazen John Marshall (TOSC);
 Clay Center
 Lee Webster Marshall (SASp); Manhattan
 Porter Marshall (TOSC); Clay Center
 Virgil Emmett Marshall (TOSC);
 Carrier, Okla.
 Lorenzo Clyde Martin (FSC);
 Cookville, Mo.
 Joaquin B. Martinez (SASp);
 Isabela, P. I.
 Hubert Cecil Marts (SA1); Junction City
 Cordelia Estella Masterson (SA3);
 Corning
 Albert Emile Mathey (SASp); Merriam
 Hazel Irene May (SASp); Manhattan
 William Clyde May (SASp); Manhattan
 John Henry Meek (SA3); Idana
 Ernest-Ellis Mercer (SASp); Sedan
 Albert Carl Mellies (AMSC); Ellinwood
 William Charles Menkus (AMSC);
 St. Louis, Mo.
 Herman Dennis Metz (SA2); Manhattan
 Wayne Alexander Mill (SA1); Eldorado
 Adolph Raymond Miller (AMSC);
 Oak Hill, Mo.
 Buford John Miller (SASp); Piedmont
 Fred William Miller (AMSC); Solomon
 Robert Henry Miller (AMSC); Coffeyville

* In School of Agriculture, first semester.

° Deceased.

STUDENTS IN SPECIAL COURSES—*continued*

- Willis Clifton Miller (ESC); Larned
 Karl Minneman (TOSC); Delphos
 Joseph Clinton Mitchell (ESC);
 St. Louis, Mo.
 Eliza Mitsch (HSC); Woodbine
 Henry Otto Molz (SA1); Deerfield
 Alva Arnold Moore (TOSC); Gardner
 James Albert Moore (ESC); Independence
 Elmer Moore (ROSC); Menlo
 Clay Ira Morris (FSC); Valley Center
 Clifford Clarence Morris (TOSC); Lindsey
 Robert Merton Morrison (SASp);
 Phillipsburg
 Paul Morton (AMSC); Elk Falls
 Ralph Moser (ROSC); Logan
 William Edward Moulton (TOSC);
 Neodesha
 Robert Fisher Mountjoy (FSC); Columbus
 Evelyn Dow Muhleman (FSC);
 Clarence, Mo.
 Laurance Reed Mulliken (SA1);
 Manhattan
 Sam Albert Mullins (SA1); Arkansas City
 Elmer Ellsworth Murphy (TOSC);
 Maple Hill
 John Kenneth Muse (SA2); Manhattan
 Ona Vashti Muxlow (SA1); Manhattan
 Marie Sarah Muxlow (SA1); Manhattan
 Arnold Jergen Nanninga (TOSC);
 Leonardville
 Russell Philetas Needham (FSC);
 Arcadia
 Robert M. Neely (SASp); Westmoreland
 Carl Fritiof Nelson (AMSC); Smolan
 John Lawrence Nelson (AMSC);
 Bristol, So. Dak.
 Walter Emil Nelson (FSC);
 Madison, So. Dak.
 Lloyd H. Neville (AMSC); Valeda
 Elwin William Niccum (TOSC); Topeka
 Raymond Powell Nichols (AMSC);
 Copeland
 Albert Louis Fred Nieman (TOSC);
 Oak Mills
 Fred James Nissen (AMSC);
 Round Lake, Minn.
 Carl Leander Nohlen (TOSC); Cleburne
 Michael J. Nolan (FSC); Wichita
 Bertha Sophia Nordgren (HSC);
 Olsburg
 Reynold E. H. Nordgren (AMSC);
 Olsburg
 Ethelyn Elvira Nordstrom (SASp);
 Leonardville
 Mike Novak (FdSC); Donora, Pa.
 Herman Lawrence Oak (FdSC);
 Wakefield, Neb.
 Fridolph Benhard Oberg (AMSC);
 Smolan
 Joe Luke O'Brien (FSC); Hepler
 John F. Oelricks (TOSC); West Mineral
 Ben Devol Oliver (AMSC); New Ulysses
 Arthur C. Olson (CSC); Lindsborg
 Hazel Verna Olson (SASp); Dwight
 Howard Luther Orr (SASp); Hammond
 Inez M. Oshel (SA1); Gardner
 Henry T. Overton (SASp);
 Kansas City, Mo.
 William Joseph Overton (SA2);
 Kansas City, Mo.
 Burr Harvey Ozment (TOSC); Manhattan
 William E. Pace (AMSC); New Port, Ark.
 Elmer Lee Palmer (SASp);
 Kansas City, Mo.
 Walter Lee Parker (FSC); Caney
 Kenneth Cecil Parkhurst (SASp);
 Kinsley
 Otto P. Parr (BSC); Wall, So. Dak.
 Sidney Charles Pasley (FSC); Sycamore
 Jake Patrick (AMSC); Spruce, Mo.
 ||Fliger S. Pemberton (SASp);
 Junction City
 Giffred Leroy Peterson (FSC);
 Marquette
 Glenn Rolander Franklin Peterson (TOSC);
 Burdick
 LeRoy Peugh (AMSC); Decatur
 Leon John Phillon (FSC); Chicago, Ill.
 Irene Pieratt (SA3); Hartford
 Celia Pipes (HSC); Hill City
 John Morton Pippett (FSC);
 Hartford, So. Dak.
 Michael Frank Pochylski (AMSC);
 Camp Funston
 Charles Pottorf (TOSC); Severy
 Carl Predmore (TOSC); Concordia
 John Ernest Prussing (FSC);
 Fort Scott
 Jerry Thomas Quinn (SASp); Manhattan
 James Harry Ramsey (SA2); Colony
 Lewis Harper Rand (MSC); Ellsworth
 George Barton Randle (AMSC); Emporia
 Otto Rassback (AMSC); Davidsonville, Md.
 Samuel Ward Raymond (DSC);
 Ottawa, Ill.
 Charles T. Read (AMSC); Longford
 Fred Joseph Redding (CrSC);
 Farley, Iowa
 Walter John Rediker (AMSC); Hope
 Gordon Redman (SASp); Great Bend
 Lawrence Edwin Reece (FSC);
 Pawnee City, Neb.
 Clarence Cecil Reed (TOSC); Marysville
 Mrs. M. H. Rees (HSC); Manhattan
 George Mathie Reeves (SASp);
 Kansas City, Mo.
 Lewis Adolph Regnier (SASp); Clyde
 Homer Stanley Reid (SASp); Rossville
 Ward Huffman Remele (SASp); Sedan
 Fred A. Rhine (SASp); Cleburne
 Lewis Martin Rhodes (ROSC); Wathena
 Charles Eugene Rice (SA1);
 Youkon, Okla.
 Edward Henry Rice (TOSC); Olpe
 Floyd Rice (ESC); Delphos
 Francis Herneisen Richardson (HSC);
 Mangum, O.
 Montella Adrian Richardson (FSC);
 Pretty Prairie
 Wilbert Jhan Rickson (AMSC); Randolph
 John Albin Rigney (FSC); Albany, Mo.
 Leo Fred Riley (SA1); Spring Hill
 Oliver William Roark (SASp); Manhattan
 Edward L. Robbins (AMSC); Wheaton
 Katie Mable Roberts (HSC); Manhattan
 Max Duane Roberts (AMSC); Pomona
 Loyd Albertus Robeson (FSC);
 Liberty, Ind.
 *Warren Homer Robinson (TOSC); Topeka
 Winnett William Robinson (SA1); Topeka
 Jennie Goddard Roe (HSC); Loma, Colo.
 Herbert Frank Roespke (FSC); Barnes
 Walter Roland Roesch (DSC);
 St. Joseph, Mo.
 Audrey Thelson Rogers (ESC); Topeka
 Wilmer Clair Romig (FSC);
 Independence
 Clarence Virgle Rost (SASp); Sedan
 Alberta Roswurm (SA2); Manhattan
 Bessie Ellen Roswurm (SA2); Manhattan
 Irving Alder Rotzler (DSC);
 Clarion, Iowa
 Walter Jerome Royer (SA1); Newton
 Nicol Gosler Rogler (TOSC);
 Matfield Green

* In School of Agriculture, first semester.

|| In Farmers Short Course, first semester.

STUDENTS IN SPECIAL COURSES—*continued*

*Earl William Rubart (TOSC); Great Bend	Homer Joseph Sloop (SASp); Manhattan
Benjamin Alfred Ruberson (FSC); Springfield, Mo.	Harry H. Slyter (TOSC); Paola
Patrick H. Ruby (FSC); St. Louis, Mo.	Charles Spurgeon Smith (FSC); Manhattan
Mona Agnes Ruby (SASp); Manhattan	Everett Smith (AMSC); Oberlin
Hugh McCoy Russell (FSC); Greenfield, Mo.	Neill Soren Smith (FSC); Miltonvale
George Robert Rutherford (ESC); Bolckow, Mo.	Phillip Ray Smith (AMSC); Le Loup
Ethel May Ruthruff (SASp); White City	Roland Leslie Smith (SASp); Manhattan
Fred Sachau (TOSC); Manhattan	Vernon Smith (AMSC); Zeandale
Isop Sagan (FSC); Portageville, Mo.	John Raymond Smithheiser (SA3); Danville
Orr Salmon (SA1); Spencer, S. Dak.	John J. Snodgrass (AMSC); Augusta
Edmund John Sampson (TOSC); Oak Hill	Theodore Hy. Solto (ESC); St. Charles, Mo.
Lydia Esther Sandow (SASp); Dillon	Ralph Sours (SASp); Fall River
Royal Theodore Sandow (SASp); Dillon	Charles Jonathan Spangler (FSC); Newton
Francis C. Sanford (FSC); Belleville	Elmer Sparks (FSC); Rago
°Arthur Jessie Sargent (FSC); Little River	John Leo Specker (AMSC); St. Louis, Mo.
Harold Sargent (AMSC); Manhattan	Burl Freeman Speer (AMSC); Logan
William Sautter (AMSC); Chapman	Kenneth McClelland Spence (FSC); McPherson
Fred Elias Saylor (SASp); Morrill	William Springer (ESC); Nashville, Tenn.
Albert William Scharde (ROSC); Neosho Falls	Karl Emmett Spurgeon (AMSC); Murdock
Herman James Scheid (AMSC); Racine, Mo.	Ralph Clarence Stahl (TOSC); Manhattan
Lewis Henry Schiesser (AMSC); Maple Hill	Jesse Gaylord Stanton (SASp); Wakeeney
Lois Wilma Schlaegal (SA2); Olsburg	Melvin Franklin Stebbins (AMSC); Junction City
Albert Fred Schmidt (FSC); Newton	Ralph Ernest Steffe (FSC); Sedgwick
Charles P. Schofield (TOSC); Manhattan	Albert Edwin Stewart (ROSC); Detroit, Mich.
Ernest August John Schoeneskoefer (AMSC); St. Louis, Mo.	Frank Clifford Stewart (AMSC); Hutchinson
Nicholas Carsten Schrum (FSC); Manning, Iowa	Julia Della St. John (AMSC); Wichita
Louis Ethan Schultz (AMSC); Gypsum	Jacob Benjamin Stouffer (FSC); Glen Elder
George William Schultz (AMSC); Albert	Harlan Ray Strader (FSC); Eaillmart, Calif.
Fred Andrew Schumming (AMSC); Herington	Paul Spencer Strand (ESC); Manhattan
Gustav Schuppert (AMSC); Arrington	Robert Elwood Stratton (AMSC); Banks, Ore.
Adolph John Schutte (FSC); Corder, Mo.	Alexander Studer (TOSC); Beloit
Charles Otto Schweizer (FdSC); St. Louis, Mo.	Hays B. Sturgeon (AMSC); Eureka
Clarence Bedford Scott (FSC); Jennings	Emma Stutz (SA3) Utica
Emo Pearl Scott (SASp); Elgin	Homer Lewis Sumners (SA2) Manhattan
James Stanley Scott (FSC); Jamesport, Mo.	Donald James Sutherland (DSC); St. Louis, Mo.
Ray Arden Scrivner (BSC); Potwin	George William Sutter (SASp); Kansas City, Mo.
William Patrick Sculley (FSC); Colony	Albert Frederick Swan (FSC); Topeka
Thora Seaton (HSC); Spirit Lake, Iowa	Elmer Swart (TOSC); Riley
William Henry Sharp (TOSC); Topeka	Gustave Swan Swenson (AMSC); Falun
Elsie Beatrice Shay (HSC); Norton	James Paul Swift (AMSC); Delavan
Thomas Andrew Shea (AMSC); Aurora	Harry Alcide Swim (SA2); Severance
Jesse Morris Sheehy (FSC); Corwin	Isaac Ray Teagarden (TOSC); La Cygne
David Sheinblatt (ESC); St. Louis, Mo.	Eugene Fields Tebow (FSC); Jamestown
Simon Peter Shields (AMSC); Lost Springs	Francis Leonard Thielen (FSC); Dorrance
William Ennis Shields (MSC); Allenton, Mo.	Ben A. Thompson (SA3); Densmore
Aaron Joseph Sholtz (ROSC); Kansas City, Mo.	Meryl Ethelyn Thornburg (SASp); Formoso
Elmer Burton Shull (AMSC); Garden City	Lawrence Enos Thrush (AMSC); Wakefield
Clifford Theodore Sibbitt (SA1); Protection	Ted Tibbitts (SA1); Richland
Marguerite Sieg (HSC); Manhattan	Herbert M. Tidd (FSC); Neosho Falls
Donald Oneil Signor (AMSC); Manhattan	Lafayette Perry Tilley (TOSC); Anthony
Alfred Walter Sinclair (AMSC); Herington	Victor Thomas Tilley (SASp); Irving
Fred Raymond Simonton (AMSC); Horton	Adolph Jacob Tobler (AMSC); Eshon
Charles C. Skinner (TOSC); Perry	Fred Carl Toburen (AMSC); Cleburne
	Herbert Dee Todd (FSC); Dahlgren, Ill.
	Frank Raymond Townsend (SASp); Madison
	William Samuel Tulloss (FSC); Ottawa
	Raymond Earl Tyler (AMSC); Horton

* In School of Agriculture, first semester.

° Deceased.

STUDENTS IN SPECIAL COURSES—*continued*

Doyle Johnson Underwood (TOSC); Matfield Green	Lloyd Vernon White (AMSC); Manhattan
William John Van Asdlen (AMSC); Minooka, Ill.	Copeland Whitney (SA1); Manhattan
Marion Egbert Van Hook (TOSC); Topeka	Raymond Joseph Whittaker (SA1); Highland
Laurence Reber Vaniman (TOSC); McPherson	Cecil Delbert Whitworth (AMSC); St. Louis, Mo.
Byron Alexander Vannordstrand (FSC); Le Roy	*Raymond Taylor Wibking (TOSC); Junction City
Leonard Anderson Vaughan (ESC); Lobelia, W. Va.	Avis Wickham (SA2); Cawker City
Nathan Bailey Vaughn (TOSC); Caldwell	Delmer Verne Wickham (AMSC); Cawker City
Homer William Vickery (TOSC); Geuda Springs	Wilbur Wakefield Wikoff (BSC); Beattie
Herbert John Viney (AMSC); Chicago, Ill.	Alvin Vernon Wilburn (SASp); Lawrence
Mona May Vogelmann (SA1); Clay Center	Helen Elouise Wilcox (HSC); Hartford
Delmer Charles Waite (FSC); Winfield	Ernest William Williams (TOSC); Steeleville, Mo.
Cecil Albert Walt (TOSC); Gove	Florence Mabelle Williams (SASp); Manhattan
Kurt Henry Walter (SASp); Manhattan	Ivan Lamont Williamson (MSC); St. John
Fred Charles Walton (AMSC); Coffeyville	Odes Scott Wilnerd (SASp); Norcatur
Jesse Clarence Walton (FSC); Belle Plaine	Wyle Winchell (AMSC); Coffeyville
George M. Walz (TOSC); Hays	William Berton Windross (DSC); Lincoln, Neb.
Ernest Alexander Ward (FSC); Kansas City, Mo.	John S. Winzeler (TOSC); Lamont
Ferne Argie Ward (SA1); Bancroft	Walter William Wishirchen (FSC); Quincy, Ill.
Harry Kneeland Wareham (SASp); Manhattan	Raymond John Wismer (SA1); Pomona
Robert Devore Watkins (DSC); Navasota, Tex.	John Henry Woellhof (AMSC); Clay Center
Benjamin Franklin Weakley (AMSC); Denver Colo.	Charles Stephen Wood (TOSC); Delia
Jerry D. Webb (FSC); Sterling	Chester Stanley Wood (SASp); Manhattan
Allen Marcus Webster (AMSC); Vesper	Dewey David Wood (TOSC); Delia
William Hargrave Weeks (SA1); Belvue	Ralph McKee Wood (FSC); Quincy, Ill.
Thomas Leo Wegeng (FdSC); Norborne, Mo.	Claborne L. Woods (AMSC); Arkansas City
Fred Xavier Wessling (AMSC); Beloit	Ray Smith Workman (SASp); Wichita
Martin Raymond Westling (TOSC); Burdick	Roger Marion Workman (SASp); Wichita
Edward Francis Whelan (TOSC); Purcell	Alexander James Wray (AMSC); Lincoln, Neb.
*Charles Lee White (AMSC); Tullia, Tex.	Albert Glenn Wright (FSC); Gerard
Clifford Vassa White (FSC); Larned	John William Yates (FSC); Smithville, Mo.
Jack Evert White (TOSC); Faulkner	Sophia Mildred Yost (SA1); Cummings
	John Albert Young (BSC); Wakefield
	Paul Brower Young (TOSC); Coldwater
	Roberta Bell Young (SASp); Manhattan

* In School of Agriculture, first semester.

Summary of Attendance, 1918-1919

	Agriculture.....	Veterinary Medicine.	Engineering.....	Agricultural Engineering.....	Architecture.....	Civil and Highway Engineering.....	Electrical Engineering.....	Mechanical Engineering.....	Flour Mill Engineering.....	Home Economics.....	General Science.		Industrial Journalism.		Music Special.		Totals.		Grand Total.
	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	
Graduate.....	9																		34
Senior.....	140	13									9	13	1	8			19	15	201
Junior.....	*55	24						9		94	8	15					82	119	254
Sophomore.....	80	19					14	9		99	16	20	5	6			123	126	322
Freshman.....	160	13					30	16	5	100	16	23	5	6			193	129	322
Special.....	*46	1					136	130	4	118	93	38	10	7			109	164	810
School of Agriculture, Special.										17	52	32	1		2	38	109	90	199
School of Agriculture, First Year.																	93	30	129
School of Agriculture, Second Year.																	29	17	46
School of Agriculture, Third Year.																	16	8	24
Housekeepers' Course.																	10	7	17
Engineering Short Courses:										25							25	25	25
Automobile Mechanics.....																			
Blacksmiths.....																	163	1	164
Carpenters.....																	12	12	24
Draftsmen.....																	11	11	22
Electricians.....																	15	15	30
Foundrymen.....																	24	24	48
Machinists.....																	6	6	12
Radio Operators.....																	17	17	34
Tractor Operators.....																	13	13	26
Agriculture Short Courses:																	128	128	256
Farmers' Short Course.....	*160																159	1	160
Creamery Short Course.....	5																5	5	10
Summer School.....																	66	453	519
Totals.....	555	70	400	19	24	92	188	161	9	455	194	141	22	27	2	38	1,950	1,185	3,135
Counted twice.....																	30	114	144
Net totals.....																	1,920	1,071	2,991

*One woman. †Two women.

Students by States and Counties, 1918-1919

STATES			
Kansas	2,597	Montana	2
Arizona	4	Nebraska	41
Arkansas	10	New Jersey	1
California	4	New Mexico	3
Colorado	16	New York	4
Florida	2	North Carolina	3
Georgia	2	North Dakota	2
Idaho	1	Ohio	1
Illinois	31	Oklahoma	46
Indiana	8	Pennsylvania	6
Iowa	15	South Dakota	24
Kentucky	1	Tennessee	2
Louisiana	1	Texas	16
Maryland	1	Utah	2
Massachusetts	2	West Virginia	1
Michigan	4	Wisconsin	3
Minnesota	7	Wyoming	2
Mississippi	1		
Missouri	117	Total	2,983

FOREIGN COUNTIES			
Philippine Islands.....	1	Cuba.....	1
Mexico.....	1	Brazil.....	2
Greece.....	1		
Russia.....	1	Total.....	8
China.....	1		

Grand total, 2,991

KANSAS COUNTIES			
Allen.....	21	Logan.....	4
Anderson.....	12	Lyon.....	27
Atchison.....	13	McPherson.....	38
Barber.....	14	Marion.....	20
Barton.....	23	Marshall.....	46
Bourbon.....	13	Meade.....	2
Brown.....	26	Miami.....	17
Butler.....	40	Mitchell.....	19
Chase.....	14	Montgomery.....	23
Chautauqua.....	16	Morris.....	20
Cherokee.....	13	Nemaha.....	17
Cheyenne.....	2	Neosho.....	14
Clark.....	4	Ness.....	17
Clay.....	56	Norton.....	35
Cloud.....	40	Osage.....	27
Coffey.....	13	Osborne.....	18
Comanche.....	14	Ottawa.....	17
Cowley.....	48	Pawnee.....	13
Crawford.....	9	Phillips.....	7
Decatur.....	8	Pottawatomie.....	57
Dickinson.....	60	Pratt.....	10
Doniphan.....	19	Rawlins.....	12
Douglas.....	24	Reno.....	50
Edwards.....	12	Republic.....	33
Elk.....	4	Rice.....	35
Ellis.....	11	Riley.....	632
Ellsworth.....	11	Rooks.....	6
Finney.....	17	Rush.....	14
Ford.....	5	Russell.....	10
Franklin.....	27	Saline.....	33
Geary.....	19	Scott.....	4
Gove.....	10	Sedgwick.....	79
Graham.....	3	Seward.....	11
Grant.....	1	Shawnee.....	77
Greeley.....	1	Sheridan.....	4
Greenwood.....	36	Sherman.....	2
Harper.....	35	Smith.....	16
Harvey.....	24	Stafford.....	14
Haskell.....	2	Stanton.....	1
Hodgeman.....	2	Sumner.....	28
Jackson.....	28	Thomas.....	13
Jefferson.....	24	Trego.....	3
Jewell.....	32	Wabaunsee.....	29
Johnson.....	23	Wallace.....	4
Kearny.....	5	Washington.....	39
Kingman.....	25	Wichita.....	1
Kiowa.....	6	Wilson.....	14
Labette.....	18	Woodson.....	18
Lane.....	2	Wyandotte.....	33
Leavenworth.....	21		
Lincoln.....	17	Total.....	2,597
Linn.....	11		

Record of Attendance, 1863-1918

COLLEGE YEAR.....	Summer School.....	Home economics short course.....	Com'cial creamery short course.....	Dairy short course...	Farmers' short course.	Apprentice.....	Special.....	Preparatory.....	Subfreshman.....	School of Agriculture.	Freshman.....	Sophomore.....	Junior.....	Senior.....	Graduate.....	Counted twice.....	Total.....	Graduated.....
1863-64								93			14						107	
1864-65								90			14						113	
1865-66								154			11		1	5			178	6
1866-67																	168	
1867-68								146			11	10	2		1		170	
1868-69								164			13	7	3	5	3		194	5
1869-70								162			22	10	5	2			*217	3
1870-71																	183	2
1871-72								136			24	14	3	6			183	5
**1873								103			26	10	2	2			212	2
1873-74																	143	5
1874-75																	231	2
1875-76																	231	5
1876-77								75			42	23	5	5			150	9
1877-78																	207	4
1878-79						1		89			89	16	12				207	9
1879-80						1		166			166	61	35	11	2		276	7
1880-81						6		178			178	48	24	9	2		267	8
1881-82						5		227			227	50	19	11			312	9
1882-83						4		241			241	60	30	12			347	12
1883-84						2		255			255	92	26	18	2		395	17
1884-85						2		271			271	71	36	16	5		401	14
1885-86						1		273			273	91	35	24	4		428	21
1886-87								303			303	100	44	24	10		481	21
1887-88								305			305	92	46	27	2		472	22
1888-89								266			266	103	41	28	7		445	25
1889-90								307			307	105	63	28	10		514	27
1890-01								343			343	135	50	53	12		593	52
1891-02								336			336	139	62	37	10		584	36
1892-03								339			339	110	66	43	29		557	39
1893-04								275			275	141	72	42	25		555	39
1894-05								353			353	121	67	71	32		572	57
1895-06								67			321	163	69	62	46		647	66
1896-07								110			316	177	77	82	57		734	55
1897-08								110			306	177	82	65	40		803	69
1898-09								162			376	193	109	69	27		870	58
1899-00								318			348	183	80	74	40		1094	58
1900-01								298			396	206	120	65	32		1321	60
1901-02								342			471	229	141	86	24		1396	52
1902-03								443			403	206	161	114	20		1574	55
1903-04								500			289	198	122	117	26		1605	102
1904-05											373	214	145	110	30		1462	107
1905-06								598			411	269	149	133	24		1650	96
1906-07								144			450	357	202	148	26		1937	119
1907-08								134			450	357	202	148	26		2192	116
1908-09								189			456	417	236	171	28		2308	139
1909-10								364			533	412	238	248	4		2305	146
1910-11								580			533	461	288	251	44		2407	204
1911-12								654			444	432	355	255	55		2523	230
1912-13											516	431	324	327	64		2626	239
1913-14											580	308	353	321	78		2626	239
1914-15											434	308	353	321	78		2626	239
1915-16											605	454	308	401	78		2626	239
1916-17											698	471	378	382	63		277	234
1917-18											433	349	284	239	36		2406	190
1918-19											810	322	251	201	34		2991	...

*Estimated.

**Calendar year.

College Enrollment, 1918-1919

THE DIVISIONS.	Men.	Women.	Total.
The Division of Agriculture	616	5	621
Graduate Students.....	9	1	10
Seniors.....	51	2	53
Juniors.....	78	1	79
Sophomores.....	99	1	100
Freshmen.....	173	1	174
Special Students.....	46	1	47
Students in Farmers' Short Course.....	159	1	160
Students in Creamery Short Course.....	5	1	6
The Division of Engineering	882	4	886
Graduate Students.....	1	1	2
Seniors.....	22	1	23
Juniors.....	29	1	30
Sophomores.....	73	1	74
Freshmen.....	370	1	371
Special Students.....	8	1	9
Students in Short Course for Auto Mechanics.....	163	1	164
Students in Tractor Operators, Short Course.....	128	1	129
Students in other Engineering, Short Courses.....	98	1	99
The Division of Home Economics		455	455
Graduates.....		2	2
Seniors.....		94	94
Juniors.....		99	99
Sophomores.....		100	100
Freshmen.....		118	118
Special Students.....		17	17
Students in Housekeepers' Course.....		25	25
The Division of General Science	218	205	423
Graduates.....	9	13	22
Seniors.....	9	23	32
Juniors.....	21	26	47
Sophomores.....	21	29	50
Freshmen.....	103	45	148
Special Students.....	55	70	125
The School of Agriculture (Secondary School)	152	62	214
Students in Agriculture.....	32	1	33
Students in Mechanic Arts.....	23	1	24
Students in Home Economics.....	99	32	131
Special Students.....	99	30	129
Summer School	66	453	519
Totals.....	1,934	1,184	3,118
Counted twice.....	30	114	144
Net Totals (not including lists cited below)	1,920	1,071	2,991
The Division of College Extension			5,412
Students in Credit Courses.....			184
Students in Vocational Courses.....			245
Students in Reading Courses.....			4,983
The Division of Engineering	1,239		1,239
Students in first contingent, Vocational Section, S. A. T. C.....	232		232
Students in second contingent, Vocational Section, S. A. T. C.....	500		500
Students in third contingent, Vocational Section, S. A. T. C.....	507		507

Home-study Service Students

(Instruction by correspondence)

For the year, January 1, 1918, to January 1, 1919, the new enrollments for credit courses numbered 184 and those for extension courses 245. These numbers do not include a number of active enrollments holding over from the previous year. During the same period 4,983 free reading courses were sent out.

In the following list of enrollments those taking credit courses are indicated by (C) and those taking extension courses by (E). Enrollments from the penitentiary (free) and free reading-course enrollments are not included in this list, though they are counted in the totals given in the above paragraph.

Effie C. Adams (C); Kansas City	Nellie Fields (C); Manhattan
Esther Amundsen (C); Bottineau, N. Dak.	J. R. Finkle (C); Moundridge
Mildred Arends (C); Kansas City	B. H. Fleenor (C); Manhattan
Florence W. Baird (C); Cherryvale	Bertha Flynn (C); Humboldt
Glen Baker (C); Towanda	Geo. Franz (C); Rozel
Floyd Bare (E); Douglass	Earl P. Friedline (C); Alden
Ida May Bare (C); Minneola	R. S. Gardner (E); Hartford
Wheeler K. Barger (C); Manhattan	(Mrs.) Florence Garringer (C); Manhattan
W. J. Barnes (E); Oswego	Anna Mae Garvie (C); Abilene
Walter J. Barr (C); Larned	Chas. L. Gastineau (C); Parsons
Sadie Barr (C); Cherokee	Mildred Geitgey (C); Anthony
Evelyn A. Beckett (C); St. Joseph, Mo.	Marie Gehn (C); Manhattan
(Mrs.) Fannie Bedker (E); Sharon Springs	J. A. Glaze (C); Zeandale
Arch L. Bell (C); Great Bend	C. C. Glenwood (E); Bonner Springs
W. W. Bell (C); Marysville	Bess L. Gordon (C); Garden City
O. E. Bemis (C); Selden	Helen Gott (C); Arlington
Lulu M. Berger (C); Sylvan Grove	Mary Graham (C); Manhattan
Lena M. Berryman (C); Wilson	(Mrs.) E. R. Greene (E); Simpson
Glen Betts (C); Detroit	Garnet Grover (C); Gooding, Idaho
Nina Birkett (C); Holton	Olive Guffey (C); Mortland
Charles J. Bizak (C); Tinken	Gladys Guild (C); Topeka
John W. Blachly (C); Manhattan	Myrtle A. Gunselman (C); Holton
Ethel Broman (C); Falun	Lucile Heiser (C); Manhattan
Sarah Boell (C); Riley	Florence Henderson (C); Kanorado
John P. Boyle (C); Stilwell	Elizabeth G. Herr (C); Easton
A. A. Brown (C); Norton	Retta Hoefer (C); Inman
Lela Bryan (C); Jonesboro	Archie Haller (C); Bucklin
G. G. Buell (C); Independence, Mo.	Marie Hammerly (C); Manhattan
Richard Bullimore (E); Tonganoxie	E. L. Harms (C); Turner
Earl W. Button (E); Kansas City, Mo.	Arthur H. Hommert (E); Willowbar, Okla.
Harriette Cates (C); Pawnee, Okla.	John A. Howell (E); Havana
Marian Chaffee (C); Lasita	Beatrice Hurd (C); Nickerson
Fay Cheesman (C); Manhattan	O. L. Husted (C); Marquette
F. H. Clark (C); De Soto	F. W. Huntington (C); Merriam
Ruth A. Clark (C); Halstead	Evelyn Humphrey (C); Elmwood, Ill.
E. F. Coffee (C); Iola	Neal Edwin Huff (C); Ft. Scott
Grace Colbert (C); Rolla	Earl Hestond (C); Yates Center
Gretta A. Collins (C); Belleville	Martin Hines (C); Esbon
Hubert L. Collins (C); Charleston, S. C.	Ward L. Hill (C); Manhattan
Mary Collins (C); Belleville	Walter Houghton (C); Emporia
H. J. Counsell (C); Garden City	Faye Irwin (C); Barnes
Verral Craven (C); Boulder, Colo.	Gifford J. Ikenberry (C); Quinter
Cline Curtis (C); Scott City	J. C. Jent (E); Clearwater
Harvey Dam (C); Marysville	Junior A. Jones (C); Pawnee Rock
Alice V. Dawson (C); Belleville	Florence Jewell (C); Goodland
Anne E. Denison (E); Northampton, Mass.	Lulu Johnson (E); Hoyt
Della Eliza Donnell (C); Ashland	Frances Hancock (C); Plains
Walter F. Dravey (E); Sabetha	Harrison L. Kennedy (C); Burlington
Mary Dudley (C); Lebanon	Nina Kirkwood (C); Marysville
Maggie Dupree (C); Covert	R. T. Kersey (C); Garden City
Lenore Edgerton (C); Randolph	Henry J. Kleihege (C); La Crosse
Louise Edginton (C); Burlingame	H. L. Klug (C); Urbana, Iowa
Jave Edwards (C); Anson	Hannah Knutson (E); Eldorado
John F. Erdley (C); Manhattan	L. D. Lacy (C); Covert
Myrle Eyerly (C); Nortonville	Blanche Lea (C); Greensburg

HOME-STUDY SERVICE STUDENTS—*continued*

Wilmer Learned (C); Stafford
 J. R. LaMont (C); Manhattan
 Gladys E. Hoffman (C); Manhattan
 Leona Hoag (C); Manhattan
 Emma Larson (C); May Day
 Wood Lebbe (C); Dayton, Ohio
 Ernest C. Liggett (C); Rosalie
 Lucile Logan (C); Lyons
 Robert E. Lyle (C); Richhill
 Duella M. Mall (C); Green
 (Mrs.) Sylvia Mantooth (E); Wayside
 Marie Manser (C); Burden
 D. C. Marshall (C); Kinsley
 Geo. Marquardt (C); Eudora
 (Mrs.) L. E. McGinnis (E); Holliday
 (Mrs.) E. V. McPherson (E); Sanborn
 J. Buford Miller (C); Piedmont
 Dorothy Miller (C); Larned
 Florence Mirick (C); Otis
 Hattie Mitchell (C); La Crosse
 H. E. Mitchell (C); Oklahoma City, Okla.
 Elizabeth Mortimer (C); Delphos
 Zenith Mullen (C); Labette
 W. G. Nanninga (C); Leonardville
 Roy Nelson (E); Zeandale
 Eulalie G. Nevins (C); Dodge City
 Lettie Maybelle Noyce (C); Stockton
 (Mrs.) Canton O'Donnell (E);
 Grand Lake, Colo.
 Mary E. O'Neil (C); Prescott
 O. G. Palmer (E); Wells
 Ora Parsons (C); Kingsdown
 Herbert G. Perry (C); Benedict
 Robert C. Perry (C); Benedict
 Carroll C. Phillips (C); Keyport, Wash.
 H. W. Phillips (C); Hutchinson
 Ruth E. Phillips (C); Manhattan
 A. C. Pivet (E); Onaga
 Jay Pounds (C); Coldwater
 R. A. Postma (C); St. Marys
 Faye Marie Powell (C); Iola
 (Mrs.) Marie Powell (C); Bucklin
 Alice Virginia Pyle (C); Hamlin
 J. T. Quinn (C); Manhattan
 Golda Rader (C); Atwood
 Irvan Rahe (E); Winkler
 Henry E. Rahe (C); Winkler
 Lela M. Rahe (C); Winkler
 C. W. Read (C); Cottonwood Falls
 Elinor Rees (C); Dawson, New Mexico
 John E. Reeves (E); Leavenworth
 I. D. Phillips (C); Chicago, Ill.
 Ethlyne Reynolds (E); Gypsum
 Edna A. Reynolds (E); Gypsum
 Loyd C. Reynolds (C); Clayton
 F. A. Rhine (C); Cleburne
 Pauline Richards (C); Delphos
 Ruth M. Ridley (C); Topeka
 Grace Riggs (E); Independence, Mo.
 (Mrs.) H. H. Robinson (E); Augusta
 Cleo Roderick (C); Attica
 Maybell Rodgers (C); Cherryvale
 Amanda Rosenquist (C); Osage City
 Fred Rumford (C); Mt. Clemens, Mich.
 Charlotte Russell (C); Winfield
 Reuben Sanders (E); Osage City
 Alfred R. Sargent (C); Manhattan
 Harold L. Sargent (C); Manhattan
 Eleanor Schroer (C); Winkler
 Lucretia Scholer (C); Milo
 Walter E. Scott (E); Sharon Springs
 C. A. Schwab (C); Cullison
 Florence Sculley (C); Garnett
 Harold K. Shaw (E); Hiawatha
 John C. Shearer (E); Arnold
 Estella B. Shelley (C); Ponca City, Okla.
 R. W. Sheldon (C); White City
 Harry E. Shuler (C); Williamstown
 Marcia Sieber (C); Great Bend
 Franklyn E. Silknitter (C); Rose Hill
 Ethel Sissons (C); Bucklin
 Sister Mary Benita (C); Bancroft, Iowa
 Caroline Sloop (C); Manhattan
 Lola M. Sloop (C); Manhattan
 Frank Smith (E); Burdett
 L. R. Smith (C); Spring Hill
 Roy C. Smith (C); Rice
 Lillian C. Stewart (C); Watson, Mo.
 Ida E. Straus (C); Lincolnville
 (Mrs.) Edith Tempero Sterritt (C); Everest
 Ralph Stewart (E); Alden
 Josephine Sullivan (C); Wamego
 Abbie D. Swafford (C); Manhattan
 James W. Tanner (E); St. John
 (Mrs.) R. E. Teller (C); Topeka
 J. F. Towel (C); Elsmore
 Elva Tudor (C); Stockton
 Wm. Turnbull (C); Pawnee City, Neb.
 Ethel Varner (C); Augusta
 F. M. Wadley (C); Wichita
 Earl Walker (C); Latham
 (Mrs.) Clarence Warren (C); Mankato
 Pearl Wartenbee (C); Newton
 William W. Weaver (C); Benton City, Ark.
 Laverne Webb (C); Cedar Vale
 J. A. Weidlein (E); Longton
 O. J. Weir (C); Ness City
 Maude Werst (C); Ozawkie
 Rupert K. Wey (E); Wichita
 Edwin F. Whedan (C); Oswego
 F. J. Whiteaker (C); Junction City
 (Mrs.) Hazel Merrillat Williams (C);
 Enterprise
 Donna Faye Wilson (C); Wichita
 Cora Winget (C); Jennings
 Margaret Woodhouse (C); Sharon Springs
 E. W. Wren (C); Humboldt
 Nellie Yantis (C); Manhattan
 A. M. Yeaton (E); Shallow Water

Students in Vocational Section

(Students' Army Training Corps)

The abbreviations following the names of students have the following signification: Am, automechanic; B, blacksmith; C, carpenter; Cl, clerk; E, electrician; F, foundryman; H, horseshoer; M, machinist; and RO, radio operator. The numerals preceding the above letters show whether the student was trained with the first contingent (May 15 to July 15, 1918), with the second contingent (July 16 to September 10), or with the third (September 15 to December 10).

Dee L. Abbott (3Am); Long Island, Kan.
Kenneth Bennett Abercrombie (3Am);
Brady, Neb.
Ralph G. Aching (2Am)
George Dewey Adams (2Am)
Samuel Davidson Adkins (1Am)
George William Ainlay (3Am);
Farnum, Neb.
Walter Albers (3Am); Platte County, Neb.
Joseph Albert (3Am); Wahoo, Neb.
James M. Albin (2Am)
Edward Conrad Allar (3C); Belden, Neb.
Charles A. Allen (3B); Falls City, Neb.
Charles Anderson Allen (1C)
James Arthur Allen (1Am)
James Franklin Allen (2Am)
Roy Glenn Allen (1Am)
Frank Guy Allison (2H)
Abe E. Alport (2Am)
Malcolm Llewellyn Alsop (2Am)
Ben Oliver Anderson (3Am);
St. Edwards, Neb.
Boyd Anderson (3Am); Lincoln, Neb.
Edward Christian Anderson (3C);
Sidney, Neb.
George Edward Anderson (2Am)
Gustaf Albert Anderson (2E)
Leonard Levern Anderson (3Am);
Wilsonville, Neb.
Lewis Mervin Anderson (1Am)
Minor Anderson (3Am); Elwood, Neb.
Oscar Joseph Anderson (2Am)
Roland E. Anderson (2Am)
William Martin Anderson (2Am)
Arthur Murdock Andrews (2H)
Ole Ervin Archer (1Am)
Thomas Preston Argubright (2Am);
Kansas City, Kan.
Joseph William Armitage (3C);
Farnum, Neb.
William Armstrong (2Am)
Ray Walter Arnold (1Am)
Edward Richard Osman (1Am)
Clarence Atwater (2C); Sublette, Kan.
Chris Bahr (2Am)
DeWitt Ballinger (2B)
Edward Joseph Barnes (2H)
John Roland Barnes (1RO)
Balthassar Leonard Bambach (2C);
Great Bend, Kan.
Frank Christian Bamberg (3Am);
Kenesaw, Neb.
Jacob Robert Banninger (2Am)
Michael E. Bannon (3RO); Emerson, Neb.
Allen Bernard Barber (3Am); Albion, Neb.
Guy Carey Barker (1Am)
Carroll McClure Barsby (2RO)
Arthur Harold Barrett (3M); Kimball, Neb.
George Harner Bartenback (3Am);
Grand Island, Neb.
Raymond Pope Barton (3Am); Omaha, Neb.
Albert John Basgall (2Am)
Blaine Lee Battery (2Am)
Lee Batty (2Am)
August Martin Baye (3Am); Omaha, Neb.
Beverly Brown Bealmer (2Am)
Samuel Ray Beamer (1Am); Parson, Kan.
George Beamgard (2Am)
Ray Oliver Bean (3E); Davenport, Neb.
Fred Henry Beason (3Am);
Nebraska City, Neb.
Joe Beeson (3Am); Minatare, Neb.
Walter Harry Beatty (3Am);
Ainsworth, Neb.
Nels Beck (3Am); Lincoln, Neb.
Ralph Pierre Beckett (1Am)
Edwin A. Beers (2Am)
John Henry Bell (2Am)
Arthur Harold Bergmark (3C);
Phillips, Neb.
Albert Fredrick Beisner (3Am);
Marysville, Kan.
William Rex Bell (1Am)
Ralph Harry Belt (2Am)
William David Benchoff (3Am);
Lincoln, Neb.
Jas. J. Benner (2Am)
John Fredrick Berk (3Am); Lincoln, Neb.
Eli Carl Berry (3RO); Neligh, Neb.
William Vincent Benny (1RO)
Leonard McMorris Bell (2RO)
Charles Forest Bartlett (3F); Omaha, Neb.
Leonard William Bender (3M);
Omaha, Neb.
Joseph Henry Bierman (2B)
Randall Charles Biart (3RO); Bellone, Neb.
George Augusta Biggs (2Am)
Ellis Lamar Billingslea (2Am)
Willis Smitley Bird (2Am)
Hersil Binger (3Am); Oakdale, Neb.
William John Bintz (3Am); Wolbach, Neb.
Francis Adam Bissing (1C); Hays, Kan.
Bruce Bixler (2E); Pittsburg, Kan.
Francis Lionel Blackmer (2Am)
Harry Edward Blackwell (1C);
Buxburg, Kan.
Weaver Harry Blewett (1Am)
Verdon Ulysses Blomfield (1Am);
Lincoln, Kan.
Evan Leon Boardman (2Am)
Ralph Porter Bodley (2Am)
Allen McCowan Boggs (3Am);
Lincoln, Neb.
Orville Boicourt (2RO)
John Solomon Bolibaugh (3Am);
Holbrook, Neb.
Roy Arthur Bollinger (2H)
Orville Thomas Bonnett (2RO)
Daniel Paul Boone (1Am)

STUDENTS IN VOCATIONAL SECTION—continued

- Frank Ainsworth Bottorf (2E); Jewell City, Kan.
 Eugene Bowersock (3Am); Thayer, Neb.
 Roy Howard Bowie (3F); Elm Creek, Neb.
 Samuel Levi Bowler (1Am)
 George R. Bowman (3Am); Albion, Neb.
 Harry McKinley Bowman (2Am)
 Louis Melvin Boyd (2Am)
 Earl George Boydston (1M)
 Charles James Bovard (1M)
 Edward Fredrick Brackman (3 Am); Minatare, Neb.
 Charles Earl Bradberry (2Am)
 James William Bradley (1RO)
 Harry Fred Braunsdorf (2Am)
 Harold Esra Breckenridge (2B)
 Castle Ivan Brewer (3RO); Thayer, Neb.
 Chas. Edward Brewer (2C); Eldorado, Kan.
 Glenn E. Brewer (3M); Omaha, Neb.
 George Elvin Breedon (3Am); Omaha, Neb.
 Thomas William Brewer (2Am)
 Harry William Brain (3Am); Lincoln, Neb.
 Marion Orbin Briggs (1E); Troy, Kan.
 T. M. Brockman (2M)
 George W. Brooks (1Am)
 Walter Scott Brosig (1Am)
 Lee Morris Brosius (2E)
 August Verner Brown (2Am)
 Leo Hugh Brown (2Am)
 William P. Brown (2M)
 William Oscar Brownlee (1Am); Stafford, Kan.
 Harold L. Bruner (3M); Geddes, S. Dak.
 John Dick Brummer (3Am); Unadilla, Neb.
 George Frederick Brust (1Am)
 Lloyd McKinley Bryan (3RO); Sidney, Neb.
 Merle Corwin Bryant (2E); Harper, Kan.
 Rollie Irvin Buckles (1E); Sedan, Kan.
 Frederick H. Budden (2M)
 James A. Budge (1Am)
 Walter Fredrick Buerki (2Am)
 Floyd Ray Bumham (1B)
 John Connell Burns (2Am)
 Lawrence Burrows (2C); Augusta, Kan.
 Noel Adrain Burt (2Am)
 Clarence Earl Busby (2C); Winfield, Kan.
 Guy Thomas Buswell (3RO); York, Neb.
 Otto Proctor Butler (1b); Cherryoak, Kan.
 John Marlin Cable (1Am); Toronto, Kan.
 Edward Antony Cain (3Am); Lisco, Neb.
 Vincent D'Paul Cain (3M); Omaha, Neb.
 Roy Elmer Calvin (1Am)
 Eckley Lynne Cameron (2Am); Neodesha, Kan.
 William Henry Cameron (2C); Little Rock, Ark.
 Arthur Alvin Campbell (2Am)
 Ralph Blaine Campbell (3M); Clay Center, Neb.
 Ralph Hopper Campbell (2Am)
 John Lawrence Cannon (1RO)
 Wade Canter (2Am)
 Fred Carlisle (3C); Bradshaw, Neb.
 Jesse C. Carter (1Am)
 Gilbert Arthur Carlson (3Am); Axtell, Neb.
 Elmer Edwin Carlson (2E); Mentor, Kan.
 James Carmody (2E);
 Harry Densil Carrol (3Am); Stanton, Neb.
 Edgar W. Carruth (2M)
 Clyde Orley Floyd Carson (1Am); Great Bend, Kan.
 Edward T. Carson (2Am)
 Delbert Leslie Carter (2Am)
 Henry H. Carter (3E); Omaha, Neb.
 James Howard Carter (3E); Plattsmouth, Neb.
 Lon Rusk Carter (3E); Omaha, Neb.
 Lorenz Thomas Carstenson (3Am); Neligh, Neb.
 Harry Clifton Carter (3Am); Arapahoe, Neb.
 Joseph Morland, Cavender (2Am)
 Samuel Girard Chacey (1Am)
 Deston Goyan Chapin (2Am)
 Harold E. Charlson (2M)
 James Scott Chestnut (1Am)
 Jimmie Chin (3Am); Omaha, Neb.
 Christian Martin Christensen (3Am); Omaha, Neb.
 Jacob Christensen (3Am); Omaha, Neb.
 Magnus Barney Christensen (3Am); Omaha, Neb.
 Phillip George Christman (1Am); Topeka, Kan.
 Guy Lee Clabaugh (3Am); Harington, Neb.
 Ralph R. Clancy (2RO); Columbus, Kan.
 David E. Clark (3Am); Verdon, Neb.
 Lewis Milton Clark (2Am)
 Murl Alvin Clark (3M); Superior, Neb.
 Raymond Clarence Clark (2C); Osborne, Kan.
 Walter Calvin Clark (2Am)
 Warren Clauson (2Am)
 Ernest Clements (2Am)
 Otto Cleo Clements (1C); Douglas, Wyo.
 Charles Oscar Cline (2Am)
 Leroy Dysart Cline (3M); Plattsmouth, Neb.
 Paul Shelley Clowers (2Am)
 Frank Moffatt Coats (1Am); Altoona, Kan.
 Burton Elmer Cochran (2C); White Water, Kan.
 James LeRoy Cochran (1M)
 David Cohen (3Am); Omaha, Neb.
 Alfred Osburn Cole (2Am)
 Walter James Coleman (3E); Inman, Neb.
 Lloyd Minot Collins (1RO)
 Roe George Collins (2E); Emporia, Kan.
 Orvin F. Coleman (2M)
 Leo T. Connor (3Am); Wood River, Neb.
 Fred Cooper Conrow (2Am)
 Ralph Cooke (1B); Beloit, Kan.
 George Caldwell Cook (2Am)
 Floyd O. Cooper (3Am); Exeter, Neb.
 Sumner E. Copple (3RO); Rosalie, Neb.
 Chas. Westernfield Corbett (2C); Attica, Kan.
 Vern Forest Cosens (1Am)
 Raymond George Costello (2Am)
 Humphry H. Cottingham (2M)
 Frank Claud Couch (3Am); Gross, Neb.
 August Albert Cowling (2Am)
 Glenn Jay Cox (3Am); Sutherland, Neb.
 Lawrence Earl Cox (2RO)
 Wayne Franklin Crabb (1Am)
 Lester Durham Cramer (1Am); Girard, Kan.
 Otto Clinton Craven (2Am)
 Glenn J. Criss (3Am); Gross, Neb.
 John V. Crocker (3E); Clay Center, Neb.
 John S. Cronin (3Am); Omaha, Neb.
 Archie Crosby (2Am)
 Russell Verl Crosby (3Am); Omaha, Neb.
 Clarence Leroy Cross (2E); Emporia, Kan.
 James Francis Cross (1M)
 Herbert Crumley (2Am)
 James Cullar (2Am)
 William Gilbert Cumming (3M); St. Edward, Neb.
 George Curran (3E); Tecumseh, Neb.
 William Joseph Curran (1C); Kansas City, Kan.
 William Leray Curry (3Am); Mitchell, Neb.
 Jesse Paul Curtis (2Am)
 Vernon Curtis (2E); Hutchinson, Kan.
 Charles Dake (3Am); Ames, Neb.
 Victor Alyea Danford (2Am)
 George Cunningham Danner (2C); Pittsburg, Kan.

STUDENTS IN VOCATIONAL SECTION—*continued*

Arthur Andrew David (2Am)
 Charles Davidson (1Am)
 Albert Henry Davis (2Am)
 Raymon John Davidson (1Am)
 Roy Vance Day (1Am)
 Gilbert Lincoln Dean (2Am)
 Carl DeBelly (3Am); McGrew, Neb.
 John Grever DeMain (1RO)
 Bert Lee Demmon (3C); Sidney, Neb.
 Lloyd George DeMoure (2RO)
 Ruel Edward Durkee (2B)
 Leo Dennis (2Am)
 Arthur Frederick Denny (3Am);
 Deweese, Neb.
 Fay Edwin Depew (2Am)
 Wallace Earl Dillman (2E);
 Winfield, Kan.
 Delbert Dillon (2Am)
 Duncan Dillon (3Am); Cook, Neb.
 Walter Fredrick Dippel (1E);
 Atchison, Kan.
 Joseph Ewgin Divisek (1Am)
 Louis Dixon (2Am)
 Bryon Franklin Dodds (2RO)
 Lorin Albert Dodge (1E); Oakland, Kan.
 Richard A. Dodisman (1Am)
 Glenn Roy Dodson (2Am)
 DeForest John Doerr (3RO); Fremont, Neb.
 James Petrich Dolan (3F); Oneill, Neb.
 Earl James Donnelly (3F); Omaha, Neb.
 John I. Donnelly (3E); Clay Center, Neb.
 Fred Olen Dougherty (2Am)
 Morrill Thornton Dow (2RO)
 Oscar Emerson Dowler (3Am);
 Weeping Water, Neb.
 Edmund Clifford Downey (2Am)
 Fred Lee Drury (2Am)
 Albert Larue Duff (2Am)
 George Frederick Dunaway (3Am);
 Plainview, Kan.
 John Morris Dunsworth (1E);
 Emporia, Kan.
 Ross Vernon Duvall (2Am)
 George Milton Dykeman (2Am)
 Osa Thomas Dishon (2Am)
 Jacob M. Doherty (2M)
 Edwin Philip Earnest (2Am)
 Karl S. Earp (2Am)
 James Wallace Eatinger (2C);
 Raymond Kan.
 Forest Joseph Eaton (2E); Grinnell, Kan.
 John Sylvester Ebbeka (3F); Geneva, Neb.
 Robert Emmett Ebeck (2Am)
 Harry Eby (2M)
 Edward Hamilton Edwards (2Am)
 Henry Ehlers (3Am); Gretna, Neb.
 Arvid Eichberg (3Am); Madison, Neb.
 Fred H. Eickmeier (3Am); Milford, Neb.
 Bernard Frank Eilers (2B)
 Jacob F. Eitzen (2H)
 George Raymon Eller (3Am);
 Schuyler, Neb.
 Lloyd John Elliott (2Am)
 Scott Benjamin Ellis (1Am)
 Clarence Rolland Elson (3Am);
 Curtis, Neb.
 Arthur Charles Elswick (1Am)
 Arthur Celes Emel (2Am)
 Clarence Parker Emery (2E);
 Formoso, Kan.
 Ralph L. Emmons (3Am); Bloomfield, Neb.
 Carl W. Emshoff (3Am); Lincoln, Neb.
 Frederick William Engel (3Am);
 Hebron, Neb.
 Clyde Henry England (3Am); Phillips, Neb.
 George Verner Engstrand (2RO)
 James Earl Epperson (2Am)
 Elton J. Erford (3Am); Staplehurst, Neb.
 Louis Otto Ernsting (2H)
 John Aaron Estabrook (1B); Alden, Kan.
 Frank C. Evans (3Am); Stella, Neb.
 Chester Harold Ewart (1Am);
 Minneapolis, Kan.
 John Fred Facklan (2Am)
 Edwin Herman Fahrlander (3C);
 Union, Neb.
 Richard J. Fangman (3Am);
 Humphreys, Neb.
 James Thomas Farris (3Am);
 Stromsburg, Neb.
 Carl E. Faught (3Am); Cozad, Neb.
 Will Russell Feder (2Am)
 Abraham Franklin Fertig (2Am)
 Clyde Joe Fetrow (1B); Hume, Mo.
 Floyd Finn Finch (3Am); Fremont, Neb.
 Clifford Aaron Finley (1Am)
 Earl F. Fishel (3E); Guide Rock, Neb.
 Fred Edd Fisher (2Am)
 J. W. Fitzwater (2H)
 Paul Harrison Flear (2Am)
 Fred Flesher (2Am)
 Clyde Vinson Fletcher (2E); Grenola, Kan.
 E. K. Flickinger (2Am)
 Clyde Clem Flinn (2Am)
 John Arthur Folken (3Am); Schuyler, Neb.
 Francis Vern Follett (2Am)
 Leonard G. Fort (2M)
 Ralph Raymond Forbes (1Am);
 Topeka, Kan.
 Pleasant Fossett (2Am)
 Corenz Monroe Fouts (1B); Oswego, Kan.
 James Russel Fowler (2Am)
 Charles John Fox (3E); York, Neb.
 Merle Edmond Frazer (1Am)
 Eli Lester Frankland (3Am); Omaha, Neb.
 Francis E. Franklin (2M)
 Arthur Lee Frederick (3Am); Omaha, Neb.
 Willie Fredrickson (2O); Concordia, Kan.
 Pearlle Rolland Freed (2C); Anthony, Kan.
 Montgomery Edward Freeland (3Am);
 Chase, Neb.
 Alva Monroe Freeman (1C); Hill City, Kan.
 Henry Frickel (3RO); Campbell, Neb.
 Muriel Sherman Fringer (3Am);
 Guide Rock, Neb.
 Robert E. Fritts (2Am)
 Ernest Loyal Fuller (2Am)
 Ralph Edward Fuller (2E);
 Cherryvale, Kan.
 Veryl Richard Fuller (3RO); Hastings, Neb.
 William G. Fuller (1Am)
 John Sherman Fulton (1RO)
 Alexander Christian Gabler (3Am);
 Winside, Neb.
 Loren Earl Gallea (2Am)
 Paul Galligan (1Am)
 Mathew Paul Gamlowski (2E);
 Topeka, Kan.
 Harry Douglas Gant (2B)
 Howard Clayton Garinger (2Am)
 Jesse Warren Garver (3Am);
 Republic City, Neb.
 Oliver Henry Gasswint (1E); Abilene, Kan.
 Patrick Charles Gaughan (3Am);
 South Omaha, Neb.
 Raymond William Gear (1Am)
 Henry Otto Gemar (3E); Sutton, Neb.
 Rolla William Geisen (2Am)
 George Bernin George (2RO)
 Paul R. Gerhardt (3Am);
 Minneapolis, Minn.
 Lyman Earl Gessell (1Am);
 Enterprise, Kan.
 Lee Edward Geyer (2RO)
 Guy R. Giersdorf (3Am); Belgrade, Neb.
 Anson Giger (3F); Guide Rock, Neb.
 Harold R. Gildersleeve (3Am);
 Wayne, Neb.
 Henry Alexander Gillan (3Am);
 Exeter, Neb.

STUDENTS IN VOCATIONAL SECTION—continued

- Claude Oran Gillett (1E); Fairbury, Neb.
 Earl Leslie Gilliland (3C);
 Fairmont, Neb.
 Earl Guy Gingles (1Am); Speed, Kan.
 Fenton O. Glancy (3Am); Nora, Neb.
 Carl Gilbert Glenn (2Am)
 Leo Andrew Glynn (1Am)
 Miller John Gordanier (1Am);
 Randall, Kan.
 Conrad E. Graf (2B)
 Elmer Otis Grafts (3Am); Laurel, Neb.
 Harry West Gragg (2B)
 Shelby Vincent Gragg (1Am)
 Oscar Lee Graham (3E); Falls City, Neb.
 Earl Ira Graul (3M); Alexandria, Neb.
 Allen Eugene Graverholz (2Am)
 Wanen Figley Gray (1Am)
 Frank Green (2Am)
 Roland Beverly Green (2Am)
 Earl Clark Griffen (3Am); Tekamah, Neb.
 Edward Claud Griffith (2Am)
 Henry Paul Grosshans (3E); Aurora, Neb.
 Lyle Stuart Graybill (3RO);
 Lincoln, Neb.
 William John Goddard (1Am)
 Davis Franklin Golden (2Am)
 Frank W. Golden (2M)
 Clarence Lee Goode (1Am)
 Stean Ivar Goode (3C); Omaha, Neb.
 Ralph Hazen Gorhutt (3RO);
 Shelton, Neb.
 Garth Grenville Gore (3C); Genoa, Neb.
 Jay Alva Gould (2C); Beloit, Kan.
 Elmer Grabill (3RO); Sidney, Neb.
 Archie Ray Graham (3RO); Falls City, Neb.
 Bernard Benjamin Gribbel (3RO);
 Chambers, Neb.
 Warren Calvin Grubb (1Am)
 Joy Pleasant Guilford (3RO);
 Marquette, Neb.
 Everett Gunn (2RO)
 Walter Vincin Guthrie (3C); Omaha, Neb.
 Ralph Vinton Guy (3E); Guide Rock, Neb.
 William Robert Haffke (3B);
 Plattsmouth, Neb.
 Paul William Henry Hager (1Am)
 Vernon Olen Hale (1Am)
 Earl Thomas Hall (3Am);
 North Platte, Neb.
 Loweth Wayne Hallowell (1Am)
 Everest Walter Hamill (2C); Colby, Kan.
 Arlie Walter Hamilton (3Am)
 Custer City, Neb.
 Benjamin Harrison Hamilton (1Am)
 Elmer Edwin Hamilton (2Am)
 William Earl Hammer (1RO)
 Vora S. Hammond (2M)
 Ephram Hiram Hampton (3F);
 Mullen, Neb.
 Ralph Elbert Handley (2Am)
 Harry Miller Hanger (3Am) Gillner, Neb.
 Eber Lon Hanks (3Am); Eddyville, Neb.
 Arthur Lee Hanna (2Am)
 Guy William Hannan (2Am)
 Alfred Hansen (3F); Minden, Neb.
 Ernest Carl Alexander Hansen (3C);
 Omaha, Neb.
 Henry August Hansen (3B);
 Clear Water, Neb.
 Henry Milton Hansen (2H)
 Leo N. Hansen (3Am); Omaha, Neb.
 Charles Elliott Hanshaw (2Am)
 Rudolph Max Harder (3Am); Albion, Neb.
 Francis Marion Hardwick (2Am)
 Charles Thomas Harkreader (2Am)
 Oliver W. Harper (2M)
 William Anderson Harris (1C)
 Leroy, Kan.
 William Max Harris (2C); Emporia, Kan.
 Roy Otis Harrold (3B); Omaha, Neb.
 Ralph Lincoln Harper (2C);
 Frankfort, Kan.
 Dennis William Harrington (3Am);
 Geneva, Neb.
 Clyde E. Harris (2Am)
 Lee William Hartman (3Am);
 Stanton, Neb.
 Roy Eli Hartnelt (2B)
 Herman John Hartwig (3RO);
 Uehling, Neb.
 Francis M. Hattan (3C); Edgar, Neb.
 William Joseph Havey (3RO);
 Wood River, Neb.
 Phillip Rosewell Hawkins (2H)
 William Randolph Hazard (3Am);
 Ralston, Neb.
 Clifford Spatacus Haxen (2C); Wayne, Kan.
 Cecil Cherry Hazlett (2Am)
 Ira Ellsworth Heathers (3B);
 Republic City, Neb.
 Callie Newton Hebrew (1Am)
 Elmer Paul Hedberg (2B)
 Ernest Conrad Hecht (2Am)
 Frederick Lawrence Hector (3Am);
 Auburn, Neb.
 Carl Lawrence Hedstrom (2Am)
 Ivan Lee Hefty (3Am); McCook, Neb.
 Linden Emerson Heim (3RO);
 Dawson, Neb.
 George Anton Helfrick (2Am)
 Le Roy Phillip Hellrich (3Am);
 Petersburg, Neb.
 Carl Weber Helmkamp (3Am);
 Burwell, Neb.
 Anton John Helmlinger (2Am)
 Guy Victor Hendrickson (2Am)
 Edward Charles Richard Henry (2Am)
 Evan F. Henry (3Am); Cambridge, Neb.
 Harley Seward Hess (3Am)
 University Place, Neb.
 L. Dene Hickman (2RO)
 Samuel Roy Hidner (1RO)
 Joseph P. Higgins (2M)
 Verny Oscar High (3RO); Bertrand, Neb.
 Archie M. Hill (3D); Omaha, Neb.
 Carl Leslie Hill (1Am); Alden, Kan.
 Warren Trawford Hobbs (2C);
 Fairview, Kan.
 Joseph Edward Hockwood (1RO)
 Archie Loy Hodgson (2Am)
 James Alexander Hoffland (3E);
 Antioch, Neb.
 Ernest John Hogg (2B)
 Charles Hohnbaum (3Am); Waco, Neb.
 Frank Edward Hoiston (3C); Sidney, Neb.
 John Henry Holiday (2Am)
 Corrie H. Hollingshead (3Am);
 Monroe, Neb.
 Arthur William Hollis (2E); Fredonia, Kan.
 Frank Finck Hollister (3B); Fullerton, Neb.
 Jesse Grant Hollister (3Am); Chapman, Neb.
 William Henry Hollaway (2Am)
 Paul Albert Holttorf (3Am); Lincoln, Neb.
 Harry Albert Hohnn (2Am)
 Charles Robert Honza (1Am)
 Henry Earl Hopkins (1Am);
 Cherryvale, Kan.
 David Frank Houser (1B); Turley, Kan.
 Herman Arthur Houser (1Am)
 Henry W. House (3Am)
 Guy O. Howard (2M)
 Leo Clarence Howard (1M)
 Lynn Jackson Howe (3E); Wahoo, Neb.
 Ross Penrose Howell (2C); Rozell, Kan.
 Albert Lawrence Hoydar (3Am);
 Fairfield, Neb.
 Clarence Eddie Hubbard (1C); Topeka, Kan.

STUDENTS IN VOCATIONAL SECTION—*continued*

Edward Hubka (3Am); Shubert, Neb.
 Oliver Sylvester Hubler (2C);
 Eldorado, Kan.
 William Hudson (2Am)
 Francis James Hughes (3E); Omaha, Neb.
 Raymond Harvey Hull (2B)
 Enos Gibbs Hugerford (1Am)
 Walter Ray Hunt (3C); Palmer, Neb.
 Samuel P. Huntley (2M)
 Alvin E. Huntsinger (2RO)
 Marvin Dewey Hurd (3Am); Lincoln, Neb.
 John Vernon Husband (3Am); Alma, Neb.
 Howard Hutchens (2C); Tampa, Kan.
 Phillip John Hutchings (2Am)
 Raymond A. Hundahl (3Am); Blair, Neb.
 Adolph Alvis Hyuby (3Am); Touby, Neb.
 Preston Ellsworth Ingle (2RO)
 Earl Roger Ipson (2C); Rolla, Kan.
 George Albert Irvine (2Am);
 John Delbert Isaacs (1M)
 Guy Hopton Jackson (2C); Peabody, Kan.
 Ova Glen Jackson (2Am)
 Arvid Jaderborg (2M)
 Charles Leonard Jadner (2H)
 Albert L. Jagger (3M); Scotts Bluff, Neb.
 Harry Raymond James (2E)
 Harry W. James (2M)
 Aldrich Janicek (3Am); Taylor, Neb.
 Lee William Jeffrey (1Am)
 Finar A. Jensen (3Am); Marquette, Neb.
 Harry R. Jensen (3Am); Fullerton, Neb.
 Marinus A. Jensen (3Am); Exeter, Neb.
 Peter Jessen (3RO); Cushing, Neb.
 Thorval Jensen (3Am); Red Cloud, Neb.
 William Christian Jepsen (3Am);
 Cedar Bluffs, Neb.
 Edward Paris Jewett (2Am)
 Ben Herald Johnson (3Am);
 St. Edward, Neb.
 Charles Lewis Johnson (2Am)
 Clarence J. Johnson (2Am)
 Herbert Lewis Johnson (3RO);
 North Loup, Neb.
 Hivan Albert Johnson (2B)
 Jesse Lloyd Johnson (3E); Clay Center, Neb.
 John B. Johnson (3Am); Lindsay, Neb.
 John Bryan Johnson (3C); Pleasanton, Neb.
 Paul J. Johnson (3Am); Osceola, Neb.
 Phil Alvis Johnson (3Am); Columbus, Neb.
 Raymond Marion Johnson (2Am)
 Wilfred Melancton Johnson (2Am)
 William J. Johnson (3Am); Davenport, Neb.
 George C. Jones (3Am); Omaha, Neb.
 Henry C. Jones (3Am); Lou Jou, Ky.
 Horace Berkley Jones (2Am)
 Martin Miller Jones (3RO); Polk, Neb.
 Miles Jones (1Am)
 Elmer Ray Jordan (2Am)
 Maurice Richard Jordan (1Am)
 Thomas Allen Joseph (2C); Topeka, Kan.
 Joseph Bernard Jungmann (1Am)
 Reed B. Kaelin (3Am); Ansley, Neb.
 Steve Kafka (3Am); Beemer, Neb.
 Edward Albert Kamprath (3Am);
 Seward, Neb.
 Herbert Martin Kamprath (3Am);
 Seward, Neb.
 Carl Gusban Kassner (3D); Omaha, Neb.
 Michael Kearney (3Am); Fullerton, Neb.
 Dwight Moody Keas (1RO)
 Lewis Charles Keller (3D); Thayer, Neb.
 Joseph Kelly (3Am); Bloomfield, Neb.
 George Wesley Keith (3B); Belgrade, Neb.
 J. C. Kerns (3Am); Craig, Neb.
 L. C. Kerns (3Am); Craig, Neb.
 Cyril W. Kinsey (3E); Dawson, Neb.
 Bernard Raymond Kelly (2Am)
 Howard S. Kimble (3Am); Brunswick, Neb.
 George Anderson Kirkpatrick (2Am)
 Walter Douglas Kirtley (3E); Cheney, Neb.
 Cash Clay Kiser (1B); Leon, Kan.
 Adolph Klein (3Am); Pleasanton, Neb.
 Henry Klein (3C); Scotia, Neb.
 Fred John Kleinweber (3Am); Burr, Neb.
 Charley John Klenk (2Am)
 Harry Klenk (2M)
 Edward R. Kloeke (3RO); Valparaiso, Neb.
 Otto William Kloppel (3Am); Leigh, Neb.
 Julius August Kragh (3RO); Omaha, Neb.
 Paul Kruger (3Am); Omaha, Neb.
 Montford Elves Knepper (3Am);
 South Sioux City, Neb.
 Edward Robert Koeppel (2C); Chicago, Ill.
 Harry Raymond Koglitiz (1M)
 Carl Francis Konantz (2Am)
 Albert, jr., Knonovalsky (2Am)
 Richard Edward Kouba (3RO);
 Verigre, Neb.
 Clarence Raymond Kuntzman (2Am)
 William Kunzman (3C); Superior, Neb.
 Charles Kurtz (2M)
 William George LaCaille (1B);
 Topeka, Kan.
 Fletcher Laffin (1Am)
 Henry LaFrenz (3Am)
 Ira D. Laizure (2Am)
 Alex William Lamb (3C); Farwell, Neb.
 Edward Joseph Lambrecht (3Am);
 Schuyler, Neb.
 Byron Thiemann Lane (3F); Stenauer, Neb.
 Preston Langley (2Am)
 Abner Joseph Lanoue (2Am)
 Roscoe Lanterman (3Am); Aurora, Neb.
 Hans Adolf Larsen (2Am)
 Lewis G. Larsen (3Am); Hazard, Neb.
 Clarence Howard Larson (3Am);
 Minden, Neb.
 Ralph Edward Larson (3Am);
 Kimball, Neb.
 Loyal Lee Lauer (2C); West Mineral, Kan.
 Archibald Earl LaValle (3F); Alma, Neb.
 Michael John Lawler (3M); Omaha, Neb.
 Andrew Jay Lawrence (3B); Alda, Neb.
 Edmund Jay Ledyard (3M); Omaha, Neb.
 Frank Raymond Lehre (3Am);
 Omaha, Neb.
 Edward George Leonard (2Am)
 Charles J. Leth (3D); Platte, Neb.
 Raymond Herbert LeVaugh (2Am)
 Carl Ludwig Liebers (3RO);
 Lincoln, Neb.
 Forrest Lee Liddle (2Am)
 Carl Jennings Lind (3Am);
 Stromberg, Neb.
 Walter Lewis Lindauer (3Am);
 St. Edward, Neb.
 Lawrence Vickerman Lindemuth (2Am)
 Frank Lindley (Am)
 David C. Lindsay (2M)
 Eddie Arthur Lindstrom (2Am)
 Nels J. Lindstrom (2Am)
 Joseph Frank Lines (2Am)
 Marian Jasper Lockard (2Am)
 Floyd Preston Locke (2Am)
 Joseph Alfred Lockwood (3Am);
 Kimball, Neb.
 Abraham David Long (3Am);
 Ainsworth, Neb.
 Abraham David Long (3Am); Gretna, Neb.
 Herman Dane Long (3Am); Pender, Neb.
 Dewey P. Loshier (3Am); O'Neill, Neb.
 Elroy Ayer Lothrop (2C); Lawrence, Kan.
 Clarence Clifford Low (1B)
 Eike Reemt Lubbers (2Am)
 Riley Merle Luce (3Am); Omaha, Neb.
 Charles Richmond Lucy (3Am);
 Long Pine, Neb.
 Walter George Luke (3Am);
 Schuyler, Neb.

- Joseph Lust (2Am)
 Nicholas J. Lux (2M)
 Carl Morris Lyman (2RO)
 Russell Harlan Lyman (1Am)
 Patrick Andrew Lynch (1Am)
 William Thomas Lyon (1B);
 Carrollton, Mo.
 Victor Anthony MacKay (1Am)
 Lester Ward Madden (1B); Agenda, Kan.
 Walter Kent Madison (2C); Emporia, Kan.
 Clarence Roger Magnuson (1Am)
 Arthur L. Mahan (3Am); Gotehenberg, Neb.
 Carl Morris Lyman (2RO)
 Russell Harlan Lyman (1Am)
 Patrick Andrew Lynch (1Am)
 William Thomas Lyon (1B); Carrollton, Mo.
 Victor Anthony MacKay (1Am)
 Lester Ward Madden (1B);
 Agenda, Kan.
 Walter Kent Madison (2C); Emporia, Kan.
 Clarence Roger Magnuson (1Am)
 Arthur L. Mahan (3Am); Gothenberg, Neb.
 Albert Clifton Mahoney (1Am)
 Charles Francis Mahoney (1M)
 Hugh Franklin MaKinney (1Am)
 William B. Mallard (2M)
 Charles F. Mandery (3Am);
 Tecumseh, Neb.
 George Francis Mann (2E); Topeka, Kan.
 William Lincoln Manning (2Am)
 Ray Martin (3Am); Stamford, Neb.
 Sidney M. Martin (3Am); Bassett, Neb.
 William Frederick Mason (3Am);
 Chappell, Neb.
 Henry Oliver Mathews (1Am)
 William McKinley Mathews (3Am);
 Imperial, Neb.
 William McKinley Matson (3Am);
 Kearney, Neb.
 Clarence Raymond Mattison (3E3);
 Albion, Neb.
 Thomas Michael May (3C); Omaha, Neb.
 James Thomas McArdle (2Am)
 Rolla Wade McCall (1RO)
 Free Swanson McCarroll (3Am);
 Battle Creek, Neb.
 Ernest Dewitt McCarty (3E); Lincoln, Neb.
 William Ray McCaslin (2RO)
 Alfred W. McClaughery (3Am);
 Stenauer, Neb.
 Homer Wilson McCauley (3RO)
 Charles LeRoy McComas (2B)
 Leonard McComas (3C); Brownville, Neb.
 Claude Ross McConaughy (3C);
 Wakefield, Neb.
 Samuel Ray McConathy (1M)
 Boyce Leonard McConnell (2C);
 Yates Center, Kan.
 Cyril Denny McConnell (3M);
 Dalton, Neb.
 Stewart Ray McCord (1Am)
 Dan McCorkendale (3Am); Wakefield, Neb.
 Harry McCormick (3RO); Schuyler, Neb.
 Joel E. McCoy (3C); Grand Island, Neb.
 Joseph J. McDaniels (2C); Morrill, Kan.
 Albert J. McDonald (2Am)
 Glenn McDonald (2Am)
 James Joe McDonnell (3M); Omaha, Neb.
 Marshall Evan McDowell (2Am)
 Roy Earl McDowell (2E);
 Phillipsburg, Kan.
 Edwin Thomas McGahn (3Am);
 Glenwood City, Wis.
 Olin I. McGrew (3Am); McGrew, Neb.
 Clarence Leslie McIlvain (2Am)
 Charles Edward McKay (1Am)
 Charlie J. McKee (3Am); Decatin, Neb.
 Milton Joseph McKeown (3Am);
 O'Neill, Neb.
 Milo Plummer McKisson (2Am)
 Paul C. McNabb (1Am)
 Thomas James McNaughton (2Am)
 James McNee (1Am);
 Cottonwood Falls, Kan.
 Leo Francis Mc Nerney (2Am)
 Harry Leemar Mead (2Am)
 George Leander Meadows (2Am)
 Charles W. Meason (2M)
 Myrill C. Meeks (3Am); Omaha, Neb.
 Carl Conrad Meisinger (3Am);
 Plattsmouth, Neb.
 Edward William Melville (1RO)
 Walter Lindon Mercer (3B);
 Broad Water, Neb.
 William Clarence Mercier (2Am)
 Richard Irvin Merrick (3Am);
 Pilger, Neb.
 Roscoe Riley Messenger (1Am)
 Loyd Leon Metcalf (1Am)
 Ernest A. Meyer (3C); Omaha, Neb.
 John Dedrich Meyer (1Am)
 Peter George Meyer (3M); Platte, Neb.
 Harry Decatur Millard (1Am)
 Oran Earl Milleson (2E); Oberlin, Kan.
 Cliff Darwin Miller (2Am)
 Ernest Emil Miller (2C); Lenexa, Kan.
 Frank Miller (3B); Stockham, Neb.
 Fred Daniel Miller (2H)
 George Archibald Miller (2Am)
 Homer Miller (2C); Neodesha, Kan.
 Loyd Miller (3Am); Brunswick, Neb.
 Peter E. Miller (2C); Arlington, Kan.
 Hugh Walter Mitchell (1Am)
 Ernest Henry Moehring (3Am)
 Omaha, Neb.
 Claude Warren Moffitt (3Am);
 Norman, Neb.
 Victor Nicholas Molinare (1Am)
 William Joseph Monahan (2E);
 Pittsburg, Kan.
 Leon Francis Montague (2B)
 Irvan Albert Moody (2Am)
 Claude Oliver Moore (3Am);
 Fairmount, Neb.
 Clyde Jacob Moore (2H)
 Daniel Moore (1Am)
 Russell Albertus Moore (3C); Ohiowa, Neb.
 William Henry Moore (2RO)
 Daniel Parker Moorman (2E);
 Smith Center, Kan.
 Tom Moravek (2Am)
 Aza D. Morgan (2Am)
 William Alexander Morgan (3Am);
 Gothenburg, Neb.
 Christopher Leo Morris (2Am)
 Evan Richard Morris (3RO); Madison, Neb.
 Arthur Harrison Moser (2RO)
 Delman Moss (3B); McCook, Neb.
 Leslie L. Moss (2M)
 Ray Leon Motts (3Am); Columbus, Neb.
 William Martin Mowbray (2Am)
 Harry Forrest Moxley (2Am)
 Clement A. Muckenthaler (2M)
 Fay Harold Mudge (3Am);
 North Platte, Neb.
 Andrew S. Muir (2M)
 William Mitchell Murphy (1C); Parth, Kan.
 Ferris Thomas Muxworthy (2Am)
 Frederick Nash (2E); Manhattan, Kan.
 Howard M. Nash (3*); Palmyra, Neb.
 Ray Louis Neil (3Am); Auburn, Neb.
 Albert Lessly Nelson (3B);
 Hartington, Neb.
 David T. Nelson (1C)
 Edwin Arthur Nelson (2Am)
 Francis Adolph Nelson (2Am)
 Frank Ernest Nelson (3Am); Loomis, Neb.
 George Homer Nelson (1Am)
 John Herbert Nelson (3Am); Genoa, Neb.
 Levi F. Nelson (2M)
 Rudolph Fredrick Nelson (2Am)

* Deceased.

STUDENTS IN VOCATIONAL SECTION—*continued*

Vinton Emerson Nelson (2C); Rozell, Kan.	Warren Hendrick Patten (1Am)
Walter Eugene Nelson (3F); Genoa, Neb.	Glen Elmo Patterson (2RO)
Raymond Thomas Neugebauer (2Am)	Howard Victor Patterson (2C); Emporia, Kan.
Hugh E. Newby (3Am); Omaha, Neb.	Raymond R. Patterson (3Am); Stanton, Neb.
Floyd E. Newcomb (2M)	James Thomas Paustian (3Am); Omaha, Neb.
Roscoe L. Newhouse (3M); Omaha, Neb.	Harry Lincoln Payne (2Am)
Philip Livingstone Newitt (1Am)	Raymond A. Payne (3Am)
Henry Arthur Newman (3M); Omaha, Neb.	LaVergne Leslie Payne (2C); Topeka, Kan.
Jay Newman (2Am)	Percy James Paxton (1Am)
Ray Newman (3C); Alma, Neb.	Edwin K. Pearce (3RO); Omaha, Neb.
John Amos Nichum (1B); Ashland Kan.	John Earle Pearce (3Am); University Place, Neb.
Carl Emanuel Nicolai (3B); Sutton, Neb.	Ora Douglas Pearson (2Am)
William D. Nicoles (3RO); Sioux City, Iowa	Albert John Peatrowsky (3Am); West Point, Neb.
Henry Pratt Nicoll (2Am)	Russel Liman Peck (1M)
Leslie William Niel (3E); Plattsmouth, Neb.	Everett Isaac Peckinpaugh (3RO); Falls City, Neb.
Byron William Nixon (3Am); Omaha, Neb.	Clyde Thomas Perkins (1B); Chapman, Kan.
LeRoy Wilcox Noble; (2Am)	William Charles Perry (2Am)
Vernon V. Noble (3D); St. Joseph, Mo.	August Thomas Peters (3RO); Bloomfield, Neb.
Jake Paul Noel (2Am)	Edward William Peters (2Am)
William Harrison Nofsinger (2Am)	Oscar P. Peters (3Am); Holdrege, Neb.
William Otto Nolte (3B); Campbell, Neb.	Albin Axel Peterson (3Am); Omaha, Neb.
George Wilhelm Nordquist (2Am)	Clarence Otto Peterson (3Am); Loup City, Neb.
Leon Eastham Norton (2E); Junction City, Kan.	Harold Richard Peterson (3*); Hartington, Neb.
Ralph Novak (3M); Schuyler, Neb.	Henry James Peterson (3M); Genoa, Neb.
Albert Philip Nutsch (2Am)	Henry Lindborg Peterson (2Am)
Carl Matatens Nutsch (2Am)	Joseph Peterson (3Am); Arcadia, Neb.
Karl Theodore Nussbeck (2C); Topeka, Kan.	Frank William Petrashek (3Am); Table Rock, Neb.
Nels Oscar Nystrom (1Am)	Guy Emerson Pettit (1E); St. Lawrence, Kan.
Harry Edgar Oakes (2Am)	Albert E. Pexton (3Am); Neleighb, Neb.
Harry William O'Brien (3Am); Manley, Neb.	Earle Wix Phillips (2C); Medicine Lodge, Kan.
Roy Francis O'Brien (1RO)	Ralph Carrol Phillips (2C); Medicine Lodge, Kan.
Kenneth Lowell Oburn (2RO)	Arthur Oliver Pierce (1E); Kansas City, Kan.
James H. O'Callaghan (3RO); Schuyler, Neb.	Arman Lewis Pinet (2RO)
Edmond F. Ochsner (3Am); Ansley, Neb.	Albert L. Piotrowski (2RO)
William Valentine O'Connell (2RO)	Perle R. Pitts (2M)
Grant O'Conner (2Am)	Leslie Hopper Pitzer (1Am)
Hugh T. O'Connor (3Am); Omaha, Neb.	Willis Francis Pinyerd (2Am)
Carl M. Oerman (2M)	Archie W. Pjerrou (3Am); Omaha, Neb.
Albert Ernest Oesterhaus (2Am)	Eugene L. Plumb (3Am); Round Valley, Neb.
Evar Maurice Ohman (3Am); Omaha, Neb.	Lawrence Henry Poland (1Am); Wichita, Kan.
Joe E. Olson (3Am); Aurora, Neb.	Paul Ahern Poland (2Am)
Russell B. Olson (3Am); Stromsburg, Neb.	Lloyd Leslie Pollett (3RO); Oxford, Neb.
George Raymond O'Neil (1Am); Marysville, Kan.	Vere Lorraine Pontious (1RO)
Ralph Christopher O'Neill (2C); Topeka, Kan.	Vern Knoard Popp (1Am)
Walter M. Ord (3d); Omaha, Neb.	Paxton Clay Porter (2C); Glen Elder, Kan.
Glenn LeRoy Ortman (3Am); Bayard, Neb.	Kenneth A. Potter (3Am); Angus, Neb.
Albert Ernest Osterhaus (3Am); Junction City, Kan.	Clifford B. Price (3Am); St. Edward, Neb.
Lyle Clair Osterhout (3C); David City, Neb.	Elmer Elwood Price (3M); Fall City, Neb.
John Ostlind (2Am)	Harold Logan Price (3C); Omaha, Neb.
George William Ott (2Am)	John Stanley Pritchard (3Am); Omaha, Neb.
George William Overbaugh (3M); Linwood, Neb.	Elmer Elwood Prior (3M); Falls City, Neb.
Benjamin Harrison Owens (3Am); Norden, Neb.	Horan Stepsten Proctety (1C)
Vernon Emery Paine (2C); Admire, Kan.	John Aaron Fruess (2Am)
Dwight Edwin Palmer (1B); Kansas City, Kan.	Charles Alex Fugh (2C); Lucas, Kan.
Richard Ray Parkhurst (3Am); Lincoln, Neb.	Charles Eugene Putman (3Am); Butte, Neb.
Alvin Long Parker (2H)	Perry Leland Putnam (2C); Admire, Kan.
Clifford Ray Parker (3Am); Broadwater, Neb.	Floyd De Witt Quinlisk (2Am)
Ward B. Parker (3D); Omaha, Neb.	Harry B. Quinn (3RO); Breda, Neb.
Joseph Nicholas Parkes (1Am)	James Alphonsus Quinn (2RO)
Harry Martin Parkhurst (3Am); Venus, Neb.	
Paul Farman (1E); Arkansas City, Kan.	
Orval Dea Paronto (1Am)	
Earl Hubert Parsons (3Am); Hartington, Neb.	
George Paton (2Am)	
John LeRoy Patrick (2Am)	

* Deceased.

STUDENTS IN VOCATIONAL SECTION—*continued*

- Arthur Henry Quinnette (2Am)
 Vernon John Ragan (3Am); Omaha, Neb.
 Frank Diets Railsback (2E); Oberlin, Kan.
 Jacob Tyrrell Railsback (1Am)
 Paul J. Rairden (2RO)
 Merle Charles Ramsbottom (2Am)
 John Anderson Ramsey (2Am)
 Sidney B. Ramsey (2M)
 Wayne Pearson Randall (2RO)
 Arthur A. Raney (3Am); Fullerton, Neb.
 Myron Lorain Ransom (3F); Upland, Neb.
 Nick Rapaich (1M)
 Alfred C. Rasmussen (3Am);
 Ainsworth, Neb.
 Arthur C. Rasmussen (3C);
 Ainsworth, Neb.
 Lars C. Rasmussen (3Am);
 Washington, Neb.
 Walter Rasmussen (3B); Marquette, Neb.
 Joseph Edward Rau (3Am);
 Cedar Creek, Neb.
 Walter Benjamin Reams (1E);
 Ablene, Kan.
 Dave William Reardon (3M); Aurora, Neb.
 James Donald Reardon (2Am)
 Raymond Andrew Reazin (1Am)
 Albert Jabez Reed (2Am)
 Earnest Anthony Reed (2Am)
 Clifford Clinton Reed (3Am);
 Shelton, Neb.
 Ulmer Guy Reed (2Am)
 Otho Forest Reeves (1Am)
 Otto Frank Reese (2Am)
 Albert L. Reif (3Am)
 Joseph Golden Reighley (1Am)
 Harry Wyatt Reike (3B); Hubbell, Neb.
 Aaron William Reitz (2B)
 LeRoy G. Renshaw (3Am);
 St. Edward, Neb.
 Harold Edward Reynolds (1B);
 Anthony, Kan.
 George F. Reznichuk (3Am); Omaha, Neb.
 George William Rice (3M); Fairbury, Neb.
 Stuart Elmer Rice (1Am)
 Ira Francis Richards (3Am);
 Decatur, Neb.
 George Alfred Rieke (3B); Chester, Neb.
 Arthur Riggs (2Am)
 Albert Mason Riley (2Am)
 John Thomas Riley (3Am); Lincoln, Neb.
 Findley Rinehart (1Am)
 George Edward Rippey (1M)
 Jesse S. Rishek (3Am); Springfield, Neb.
 Kenneth John Roach (1E);
 Burlingame, Kan.
 Harold Russell Robbins (3Am);
 Los Angeles, Cal.
 Robert Loin Robertson (1Am)
 John Hilbert Robbins (3C);
 Dullaghan, Neb.
 Frank Parker Robinson (2Am)
 Henry A. Robinson (3RO);
 Cedar Rapids, Neb.
 Lee E. Robinson (3Am); Clarks, Neb.
 Mathew Wilson Robinson (2Am)
 Ray Roland Robinson (3M); Benson, Neb.
 Elwin Clayton Roby (2H)
 Stephen Rockwell (3F);
 Weeping Water, Neb.
 James Evan Roderick (2RO)
 Phillip A. Roehrig (3E); Omaha, Neb.
 Harrison Lloyd Rogers (2Am)
 John Thomas Rogers (2Am)
 Rudolph H. Rohrs (3Am); Rohrs, Neb.
 Charles Dean Roice (2Am)
 Eugene Peter Rondeau (3E); Scotio, Neb.
 Rodney Earl Rose (2Am)
 Will A. Roth (2Am)
 Don Victor Rothenberger (2E);
 Osborne, Kan.
 David Knox Roush (3Am); Omaha, Neb.
 Willis C. Rowland (3Am); Hastings, Neb.
 Jesse Manval Royse (1Am)
 Warren A. Rude (2Am)
 Joseph C. Rudolph (3Am); Kearney, Neb.
 William B. Rumbolz (3Am); Lincoln, Neb.
 Ear. N. Russell (3Am); Grafton, Neb.
 William Hugh Russell (3Am);
 Fullerton, Neb.
 Walter Joseph Ryan (3RO); Omaha, Neb.
 Clarence C. Ryman (3Am); Kalsey, Neb.
 Earl Ringland Saladen (3RO);
 Red Cloud, Neb.
 Wilbert Ray Sale (2H)
 LaVern A. Samuelson (3Am);
 Hildreth, Neb.
 Fred Charles Sanders (1E);
 Independence, Kan.
 Martin Christian Sanders (3Am);
 Lincoln, Neb.
 William Emanuel Sanders (3RO);
 Hooper, Neb.
 Warwick Saunders, jr. (3Am);
 Omaha, Neb.
 Daniel A. Sawter (3C); Scotia, Neb.
 Melvin James Savage (2Am)
 Robert L. Sayles (2M)
 Anthony Scalapino (2RO)
 Alvin Carl Schaefer (3Am); Omaha, Neb.
 John Gottlieb Schafer (2Am)
 Fredrick Alexander Scheetz (2Am)
 Charles Henry Schetzer (RO);
 Manchester, Kan.
 Herman Berg Scheelhorn (2Am)
 Clarence John Schmidt (2RO)
 Ruben August Schneider (1Am)
 Ammett Harry Schreiner (2H)
 Vernon Guy Schrivner (2RO)
 William Henry Schroeder (3M);
 Syracuse, Neb.
 Carl Herman Schuele (1E); Atchison, Kan.
 Frank Albert Schulte (3Am); Wynot, Neb.
 Bernard Joseph Schultz (3M);
 Beatrice, Neb.
 John Frederick Schultz (3M); Walton, Neb.
 Martain Godfrey Schulze (2H)
 Henry Schutte (3Am); Lincoln, Neb.
 Paul Dewey Schywhart (2Am)
 Edward Raymond Scott (1Am);
 Arcadia, Kan.
 Arthur Mayo Seaman (1C)
 Robert Marion Seamster (2Am)
 Walter Seitzer (3C); Omaha, Neb.
 William Henry Seleman (2Am)
 Clifton Seusy (1Am)
 Clarence Walter Sewell (3Am);
 Omaha, Neb.
 John Hugh Sexton (1Am)
 Arthur Thompson Shamp (3Am);
 Lincoln, Neb.
 James Milburn Shannon (1Am)
 Raymond Floyd Shank (1Am)
 Charles Dennis Sharp (2RO)
 Russell Lee Sharp (2Am)
 Orvil Leroy Shaw (3Am); Mills, Neb.
 Russell Douglas Shaw (2C);
 Lawrence, Kan.
 Glenn Arley Shawner (2RO)
 George B. Sherwood (2Am)
 Thurman Howard Sherwood (2Am)
 Leon Edgar Shield (3Am); Atlanta, Neb.
 Roy Leonard Shomrs (1RO)
 Clarence Alvin Short (2Am)
 Roy Adrin Shroyer (2Am)
 Arthur F. Siren (3Am); Lincoln, Neb.
 Earnest Carl Skiles (2Am)
 Henry D. Skiles (3Am); Omaha, Neb.
 Elmer Hubert Slaybaugh (2RO)
 Emil Slechts (2Am)
 Frank Sherman Sloan (2Am)

STUDENTS IN VOCATIONAL SECTION—*continued*

- Ward Marshall Smiley (3Am);
Omaha, Neb.
Andrew Love Smith (1M)
David William Smith (1E); Topeka, Kan.
Everett Edward Smith (2Am)
Glenn Irwin Smith (1Am)
Joe Leonard Smith (2B)
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W. M. Sartorius

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L. R. Sellers
N. D. Bruce
L. T. Hixon
J. F. Painter
S. Fairman
C. L. Shellenberger
W. T. Rolfe
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E. C. Abbott
R. V. Gross
H. Combs
W. H. Koenig
G. D. Morris
I. W. Lewis
R. S. Jennings

Horns:

B. Smith
E. T. Means
W. E. Forney
F. Miller

Trombones:

A. P. St. John
R. Abbott
E. Kraybill
R. O. Day
J. E. Byers
E. M. Cunningham

Baritones:

C. C. Benedict
C. L. Quear

Saxophones:

P. J. Hershey
C. F. Swingle
E. E. Wintermute
H. Humphries

Basses:

O. L. Gibson
F. R. Hines
C. E. Zollinger
E. D. Munsell

Drums:

G. S. Davis
L. Clark
N. S. Spangler
O. D. Cox

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DORIS M. BUGBEY, *Concert Master*

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C. A. Downing
Dale Backman
Doris Mell
Georgia Carihfield
Julia Keller
Irene Drake
E. C. Abbott
C. H. Cloud

Cellos:

C. Browning
C. L. Howenstine
R. Maupin

Flute:

J. Riddell

Clarinets:

J. P. Fallis
L. R. Sellers
N. D. Bruce

Horns:

B. Smith
E. T. Means

Trumpets:

R. V. Gross
H. Combs

Trombones:

John Gullledge
Genevra Adams
A. P. St. John

Tuba:

O. Benedict

Oboe:

P. Fetzer

Harp:

Cora E. Brown

Piano:

Inez Backman

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Charles Haines Cloud	Clifford Howard Myers
Frank Harold Collins	Howard Adams O'Brien
Harold Bullet Combs	Horace Malvern Randels
John Harold Epperson	William Chain Robison
Ralph St. Clair Jennings	Clare Liggett Shellenberger
Paul Kovar	Clayton Needham Smith
LeRoy Markle Leiter	Nathaniel Sheridan Spangler
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Ruby Louise Crocker	Jessie Enola Miller
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Lois Margaret Hanna	Mary Henrietta Smith
Miriam Ellen Harling	Norine Ardeth Weddle
Ruth Garfield Harrison	Winifred West
Flora Pearl Hoots	

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